



SATURDAY, JUNE 22, 1872.

Matthias W. Baldwin and Early American Locomotives.

M. Baird & Co., the proprietors of the Baldwin Locomotive Works, have prepared a beautiful illustrated catalogue of the locomotives which they manufacture, which is prefaced by a very interesting history of the works, including, indeed, a general history of the locomotive in America, special prominence being given to the part—a large one—taken by the late Matthias W. Baldwin, the founder of the establishment, in the manufacture and improvement of American locomotives. From a advance copy of the work we are permitted to copy the following :

In 1829-30 the use of steam as a motive power on railroads had begun to engage the attention of American engineers. A few locomotives had been imported from England, and one (which, however, was not successful) had been constructed at the West Point Foundry, in New York City. To gratify the public interest in the new motor, Mr. Franklin Peale, then proprietor of the Philadelphia Museum, applied to Mr. Baldwin to construct a miniature locomotive for exhibition in his establishment. With the aid only of the imperfect published descriptions and sketches of the locomotives which had taken part in the Rainhill competition in England, Mr. Baldwin undertook the work, and on the 26th of April, 1831, the miniature locomotive was put in motion on a circular track made of pine boards covered with hoop iron, in the rooms of the Museum. Two small cars, containing seats for four passengers, were attached to it, and the novel spectacle attracted crowds of admiring spectators. Both anthracite and pine-knot coal were used as fuel, and the exhaust steam was discharged into the chimney, thus utilizing it to increase the draught.

The success of the model was such that, in the same year, Mr. Baldwin received an order for a locomotive from the Philadelphia, Germantown & Norristown Railroad Company, whose short line of six miles to Germantown was operated by horse-power. The Camden & Amboy Railroad Company had shortly before imported a locomotive from England, which was stored in a shed at Bordentown. It had not yet been put together; but Mr. Baldwin, in company with his friend Mr. Peale, visited the spot, inspected the detached parts, and made a few memoranda of some of its principal dimensions. Guided by these figures and his experience with the Peale model, Mr. Baldwin commenced the task. The difficulties to be overcome in filling the order can hardly be appreciated at this day. There were few mechanics competent to do any part of the work on a locomotive. Suitable tools were with difficulty obtainable. Cylinders were bored by a chisel fixed in a block of wood and turned by hand. Blacksmiths able to weld a bar of iron exceeding one and one-quarter inches in thickness, were few, or not to be had. It was necessary for Mr. Baldwin to do much of the work with his own hands, to educate the workmen who assisted him, and to improvise tools for the various processes.

The work was prosecuted, nevertheless, under all these difficulties, and the locomotive was finally completed, christened the "Old Ironsides," and tried on the road, November 23, 1832. The circumstances of the trial are fully preserved, and are given, further on, in the extracts from the journals of the day. Despite some imperfections, naturally occurring in a first effort, and which were afterward, to a great extent, remedied, the engine was, for that early day, a marked and gratifying success. It was put at once into service, as appears from the company's advertisement three days after the trial, and did duty on the Germantown road and others for over a score of years.

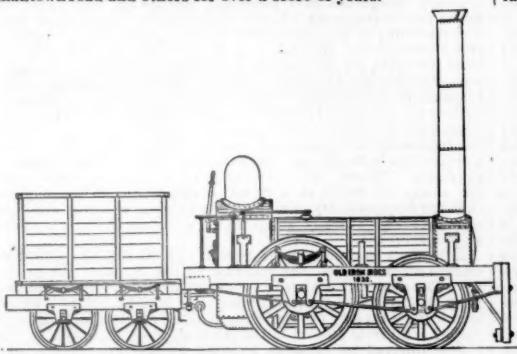


Fig. 1.—THE "OLD IRONSIDES." 1. 32.

The "Ironsides" was a four-wheeled engine, modeled essentially on the English practice of that day, as shown in the "Planet" class, and weighed, in running order, something over five tons. The rear or driving-wheels were 54 inches in diameter on a crank-axle placed in front of the fire-box. The cranks were 39 inches from center to center. The front wheels, which were simply carrying wheels, were 45 inches in diameter, on an axle placed just back of the cylinders. The cylinders were 9½ inches in diameter by 18 inches stroke, and were attached horizontally to the outside of the smoke-box, which was D-shaped, with the sides receding inwardly, so as to bring the centre line of each cylinder in line with the centre of the crank. The wheels were made with heavy cast-iron hubs, wooden spokes and rims, and wrought-iron tires. The frame was of wood, placed outside the wheels. The boiler was 30 inches in diameter, and contained 72 copper tubes, 18 inches in diameter and 7 feet long. The tender was a four-wheeled platform, with wooden sides and back, carrying an iron box for a water-tank, inclosed in a wooden casing, and with a space for fuel in front. The engine had no cab. The valve-motion was given by a single loose eccentric for each cylinder, placed on the axle, between the crank and the hub of the wheel. On the inside of the eccentric was a half-circular slot, running half way around. A stop was fastened to the axle at the arm of the crank, terminating in a pin which projected into the slot. This pin would thus hold the eccentric at one end or the other of the half-circular slot, and the engine was reversed by moving the eccentric about the axle, by means of moveable hand-levers set in sockets in the rock-shafts, until it was arrested and held by the pin at one end or the other of the slot. The rock-shafts, which were under the footboard, had arms above and below, and the eccentric straps had each a forked rod, with a hook, or an upper and lower latch or pin, at their extremities, to engage with the upper or lower arm of the rock-shaft. The eccentric-rods were raised or lowered by a double treadie, so as to connect with the upper or lower arm of the rock-shaft, according as forward or backward gear was desired. A peculiarity in the exhaust of the "Ironsides" was that there was only a single straight pipe running across from one cylinder to the other, with an opening in the upper side of the pipe, midway between the cylinders, to which was attached

at right angles the perpendicular pipe into the chimney. The cylinders, therefore, exhausted against each other; and it was found, after the engine had been put in use, that this was a serious objection. This defect was afterward remedied by turning each exhaust pipe upward into the chimney, substantially as is now done. The steam-joints were made with canvas and red lead, as was the practice in English locomotives, and in consequence much trouble was caused, from time to time, by leaking.

The *United States Gazette* of Nov. 24, 1832, remarks :

"A most gratifying experiment was made yesterday afternoon on the Philadelphia, Germantown & Norristown Railroad. The beautiful locomotive engine and tender, built by Mr. Baldwin of this city, whose reputation as an ingenious mechanist is well known, were for the first time placed on the road. The engine traveled about six miles, working with perfect accuracy and ease in all its parts, and with great velocity."

The *Chronicle* of the same date noticed the trial more at length :

"It gives us pleasure to state that the locomotive engine built by our townsmen, M. W. Baldwin, has proved highly successful. In the presence of several gentlemen of science and information on such subjects, the engine was yesterday placed upon the road for the first time. All her parts had been previously highly finished and fitted together in Mr. Baldwin's factory. She was taken apart on Tuesday and removed to the company's depot, and yesterday morning she was completely together, ready for travel. After the regular passenger cars had arrived from Germantown in the afternoon, the tracks being clear, preparation was made for her starting. The placing fire in the furnace and raising steam occupied twenty minutes. The engine (with her tender) moved from the depot in beautiful style, working with great ease and uniformity. She proceeded about half a mile beyond the Union Tavern, at the town line, and returned immediately, a distance of six miles, at a speed of about twenty-eight miles to the hour, her speed having been slackened at all the road crossings, and it being after dark, but a portion of her power was used. It is needless to say that the spectators were delighted. From this experiment there is every reason to believe this engine will draw thirty tons gross, at an average speed of forty miles an hour, on a level road. The principal superiority of the engine over any of the English ones known, consists in the light weight—which is but between four and five tons—her small bulk and the simplicity of her working machinery. We rejoice at the result of this experiment, as it conclusively shows that Philadelphia, always famous for the skill of her mechanics, is enabled to produce steam-engines for railroads combining so many superior qualities as to warrant the belief that her mechanics will hereafter supply nearly all the public works of this description in the country."

On subsequent trials, the "Ironsides" attained a speed of thirty miles per hour, with its usual train attached. So great were the wonder and curiosity which attached to such a novelty, that people flocked to see the marvel, and eagerly bought the privilege of riding after the strange monster. The officers of the road were not slow to avail themselves of the public interest to increase their passenger receipts, and the following advertisement from *Poulson's American Daily Advertiser* of November 26, 1832, will show that as yet they regarded the new machine rather as a curiosity and a bait to allure travel than as a practical every-day servant :

"NOTICE.—The locomotive engine (built by M. W. Baldwin, of this city) will depart daily, when the weather is fair, with a train of passenger cars. On rainy days horses will be attached."

This announcement did not mean that in wet weather horses would be attached to the locomotive to aid it in drawing the train, but that the usual horse-cars would be employed in making the trips upon the road without the engine.

Upon making the first trip to Germantown with a passenger train with the "Ironsides," one of the drivers slipped upon the axle, causing the wheels to track less than the gauge of the road and drop in between the rails. It was also discovered that the valve arrangement of the pumps was defective, and they failed to supply the boiler with water. The shifting of the driving-wheel upon the axle fastened the eccentric, so that it would not operate in backward motion. These mishaps caused delay and prevented the engine from reaching its destination, to the great disappointment of all concerned. They were corrected in a few days, and the machine was used in experimenting upon its efficiency, making occasional trips with trains to Germantown. The road had an ascending grade, nearly uniform, of 32 feet per mile, and for the last half mile of 45 feet per mile, and it was found that the engine was too light for the business of the road upon these grades.

Such was Mr. Baldwin's first locomotive, and it is related of him that his discouragement at the difficulties which he had undergone in building it and in finally procuring a settlement for it was such that he remarked to one of his friends, with much despatch, "That is our last locomotive."

It was some time before he received an order for another, but meanwhile the subject had become singularly fascinating to him, and occupied his mind so fully that he was eager to work out his new ideas in a tangible form.

Shortly after the "Ironsides" had been placed on the Germantown road, Mr. E. L. Miller, of Charleston, S. C., came to Philadelphia and made a careful examination of the machine. Mr. Miller had, in 1830, contracted to furnish a locomotive to the Charleston & Hamburg Railroad Company, and accordingly the engine "Best Friend" had been built under his direction at the West Point Foundry, New York. After inspecting the "Ironsides," he suggested to Mr. Baldwin to visit the Mohawk & Hudson Railroad and examine an English locomotive which had been placed on that road in July, 1831, by Messrs. Robert Stephenson & Co., of Newcastle, England. It was originally a four-wheeled engine of the "Planet" type, with horizontal cylinders and crank-axle. The front wheels of this engine were removed about a year after the machine was put at work, and a four-wheeled swiveling or "bogie" truck substituted. The result of Mr. Baldwin's investigations was the adoption of this design, but with some important improvements. Among these was the "half-crank," which he devised on his return from this trip, and which he patented September 10, 1834. In this form of crank, shown in fig. 2, the outer arm is omitted, and the wrist is fixed in a spoke of the wheel. In other words, the wheel itself formed one arm of the crank. The result sought and gained was that the cranks were strengthened, and, being at the extremities of the axle, the boiler could be made larger in diameter and placed lower. The driving-axle could also be placed back of the fire-box, the connecting rods passing by the sides of the fire-box and taking hold indirectly of the wheels. This arrangement of the crank also involved the placing of the cylinders outside the smoke-box, as was done on the "Ironsides,"

By the time the order for the second locomotive was received Mr. Baldwin had matured this device and was prepared to embody it in practical form. The order came from E. L. Miller, in behalf of the Charleston & Hamburg Railroad Company, and the engine bore his name, and was completed February 18, 1834. It was on six wheels; one pair being drivers, four and a half feet in diameter, with half-crank axle placed back of the fire-box as above described, and the four front wheels combined in a swiveling truck. The driving-wheels, it should be observed, were cast in solid bell-metal! The combined wood and iron wheels used on the "Ironsides" had proved objectionable, and Mr. Baldwin, in his endeavor to find a satisfactory substitute, had recourse to brass. June 29, 1833, he took out a patent for a cast-brass wheel, his idea being that by varying the hardness of the metal the adhesion of the drivers on the rails could be increased or diminished at will. The brass wheels on the "Miller," however, soon wore out, and the experiment with this metal was not repeated. The "E. L. Miller" had cylinders ten inches in diameter; stroke of piston, sixteen inches; and weighed, with water in the boiler, seven tons eight hundredweight. The boiler had a high dome over the fire-box, as shown in fig. 3; and this form of construction, it may be noted, was followed, with a few exceptions, for many years.

The valve-motion was given by a single fixed eccentric for each cylinder. Each eccentric had two arms attached to it, one above and the other below, and, as the driving-axle was back of the fire-box, these arms were prolonged backward under the footboard, with hooks on the inner side of the end of each. The rock-shaft had arms above and below its axis, and the hooks of the two rods of each eccentric were moved by hand-levers so as to engage with either arm, thus producing backward or forward gear. This form of single eccentric, peculiar to Mr. Baldwin, was in the interest of simplicity in the working parts, and was adhered to for some years. It gave rise to an animated controversy among mechanics as to whether, with its use, it was possible to get a lead on the valve in both directions. Many maintained that this was impracticable; but Mr. Baldwin demonstrated by actual experience that the reverse was the case.

Meanwhile the Commonwealth of Pennsylvania had given Mr. Baldwin an order for a locomotive for the State Road, as it was then called, from Philadelphia to Columbia, which, up to that time, had been worked by horses. This engine, called the "Lancaster," was completed in June, 1834. It was similar to the "Miller," and weighed 17,000 pounds. After it was placed in service, the records show that it hauled at one time 19 loaded burden cars over the highest grade between Philadelphia and Columbia. This was characterized at the time by the officers of the road as an "unprecedented performance." The success of the machine on its trial trips was such that the Legislature decided to adopt steam-power for working the road, and Mr. Baldwin received orders for several additional locomotives. Two others were accordingly delivered to the State in September and November respectively of that year, and one was also built and delivered to the Philadelphia & Trenton Railroad Company during the same season. This latter engine, which was put in service October 21, 1834, averaged 21,000 miles per year to September 15, 1840.

These early locomotives, built in 1834, were the types of Mr. Baldwin's practice for some years. Their general design is shown in fig. 3. All, or nearly all of them, embraced several im-

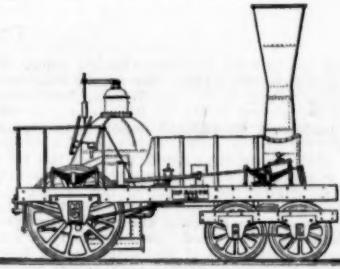


Fig. 3.—BALDWIN ENGINE, 1834.

portant devices, which were the results of his study and experiments up to that time. The devices referred to were patented September 10, 1834, and the same patent covered the four following inventions, viz.:

1. The half-crank, and method of attaching it to the driving-wheel. (This has already been described.)

2. A new mode of constructing the wheels of locomotive engines and cars. In this the hub and spokes were of cast-iron,

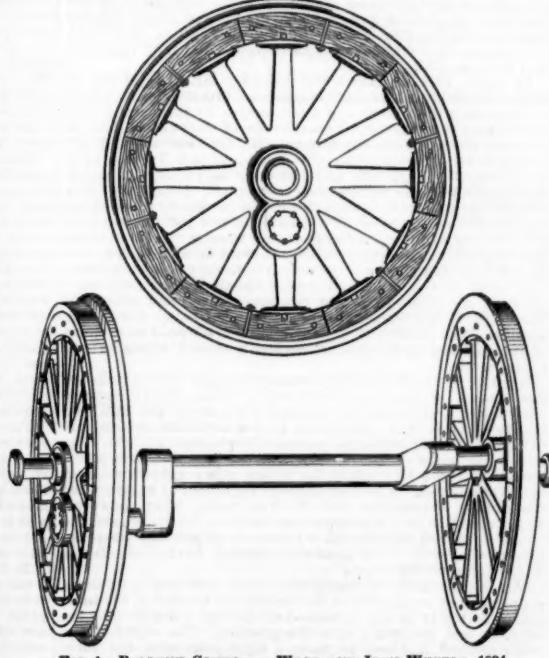


Fig. 4.—BALDWIN COMPOUND WOOD AND IRON WHEELS, 1834.

cast together. The spokes were cast without a rim, and terminated in segment flanges, each spoke having a separate flange disconnected from its neighbors. By this means, it was claimed, the injurious effect of the unequal expansion of the materials composing the wheels was lessened or altogether prevented. The flanges bore against wooden felices, made in two thicknesses and put together so as to break joints. Tenons or pins

projected from the flanges into openings made in the wooden felloes to keep them in place. Around the whole the tire was passed and secured by bolts. The above sketch shows the device.

3. A new mode of forming the joints of steam and other tubes. This was Mr. Baldwin's invention of ground joints for steam-pipes, which was a very valuable improvement over previous methods of making joints with red-lead packing, and which rendered it possible to carry a much higher pressure of steam.

4. A new mode of forming the joints and other parts of the supply-pump, and of locating the pump itself. This invention consisted in making the single guide-bar hollow and using it for the pump-barrel. The pump-plunger was attached to the piston-rod at a socket or sleeve formed for the purpose, and the hollow guide-bar terminated in the vertical pump-chamber. This chamber was made in two pieces, joined about midway between the induction and ejection pipes. This joint was ground steam-tight, as were also the joints of the induction-pipe with the bottom of the lower chamber, and the flange of the ejection-pipe with the top of the upper chamber. All these parts were held together by a stirrup with a set-screw in its arched top, and the arrangement was such that by simply unscrewing this set-screw the different sections of the chamber, with all the valves, could be taken apart for cleaning or adjusting. The cut below illustrates the device.

It is probable that the five engines built during 1834 embodied all, or nearly all, these devices. They all had the half-crank, the ground joints for steam-pipes (which was first made by him in 1833), and the pump formed in the guide-bar, and all had the four-wheeled truck in front, and a single pair of drivers back of the fire-box. On this position of the driving-wheels Mr. Baldwin laid great stress, as it made a more even distribution of the weight, throwing about one-half on the

How the State may Affect the Management of Railroads.

The following discussion of the methods by which the management of railroads may be influenced by the State through legislation or otherwise is given in the last report of the Massachusetts Railroad Commissioners:

It now remains to consider the different methods through which the adoption of this or any other systematic policy may be introduced into the railroad management of the State. This is by far the most difficult task which has devolved upon the Commissioners. Railroad officials are apt to receive with complacency, if not with indifference, abstract discussions of any system of railroad management differing from that to which they have been accustomed, so long as the proposed change is matter of discussion only; when, however, it becomes a question of actually accepting a policy suggested, the case changes greatly. The tolerably extended investigations of the Commissioners have disclosed three methods and three methods only, through which it might be attempted to impose upon the railroad corporations a fair trial of such a policy as they have suggested. These methods are—

1. Through the agents of compulsory legislation, seeking to regulate fares and freights by statute enactments.

2. Through the influence of competition and example, by the operation of certain public or State roads side by side with roads in the hands of private corporations; and

3. By the results gradually but inevitably brought about in this country through the agency of an enlightened public opinion making itself felt by means of discussion and popular agitation.

It is now proposed briefly to discuss the results which may be

the man who travels every day and by accommodation train pays exactly the same rate (two cents) per mile, as he who travels once a year by express. When a similar law, applying to all roads in the Commonwealth paying more than 8 per cent. dividends per annum, was proposed in the Legislature of 1871, the discussion upon it elicited such unexpected results from the operation of such a law that the measure was rejected. For instance: though the bill was limited in its operation to roads paying annual dividends of 8 per cent. and upward, the effect of competition made it apply to other roads which either paid less dividends, or, in some cases, had never paid any dividend at all; practically threatening such roads with bankruptcy. Again, there is not a considerable business center in the Commonwealth which is not surrounded by towns in which people have settled, built houses and effected every arrangement for residence, relying upon a regular and very cheap access by rail to their places of daily business. A law which substituted a uniform rate of two cents a mile for the commutation rates at which such persons travel would necessitate an entire change in their modes of life. Such a system might work well where a community has grown up under it; if, however, suddenly by act of legislation introduced into a community which has established itself under the discriminating tariffs always hitherto in use in Massachusetts, the Commissioners do not see how it could fail to produce most disastrous results. How serious as regards regular season-ticket passengers such a change would be may be inferred from an examination of the tables accompanying the answer of the corporations to the Commissioners' circular of August 10, *ante* pp. 25-25. From these it will be seen that those who travel most on the roads of this State, instead of paying two cents per mile, as is proposed, now pay but from 4 cent to 1½ cents per mile.

The rule of uniform mileage rate is also wholly opposed to the fundamental principle of taxation, that the burden should in all cases be so imposed as to rest most heavily where it will be least felt. The man who travels every day over a given route has a right, on every principle of economy, to buy his passage at wholesale rates, and to him a concession is a matter of great moment; whereas it is of comparatively little consequence what he pays, within reasonable limits, to the man who travels very rarely. A law, therefore, which imposes an additional cent per mile on the daily traveler to give it to the occasional one does not seem to place the burden of taxation where it is least felt. The Commissioners do not wish to express a decided opinion on a point which they have had no opportunity thoroughly to investigate, but they are nevertheless inclined to believe that the system of discriminating rates now generally in use on the Massachusetts roads is not only more profitable to the corporations than the uniform price per mile system of the New York road, but at the same time is more advantageous to the traveling community through its practical adjustment of the burden.

An effort at another form of statute regulation of freights and fares has recently been made in Illinois, and the experiment is now upon trial. The several roads have been classified according to their gross earnings per mile, and tariffs of maximum charges have been framed and made applicable to each class of roads. It will be interesting to observe the results of this experiment, but the recent report of the State Commissioners holds out no encouragement in regard to it; it is difficult, also, to see how competition can fail to make the rates intended for roads of one class applicable in practice to roads of another. Such a system of classification must further prove a somewhat inflexible rule, as it admits of no discrimination in favor of the special requirements either of localities or of corporations. The Boston & Providence Railroad, for instance, and the Reading Railroad may annually earn equal amounts per mile, so that upon this basis they would be classified together, but the first is a passenger and the second a coal road. To compel, however, the Boston & Providence to carry coal at Reading rates, or the Reading to carry passengers at the Boston & Providence rates, would not commend itself as a thoroughly matured measure of railroad reform.

The final difficulty with all legislation of this class is its extremely dangerous and politically corrupting tendency. It forces the corporations, whether they wish to come there or not, into the lobby of the Legislature and the rooms of committees and commissions; they are forced there for the protection of their interests, for the essence of the system is that certain persons, whether the Legislature itself or officials designated by the Legislature, have devolved upon them the responsibility of establishing the revenue of property belonging to others. The Commissioners have grave doubts as to the success of any effort at the regulation of the railroad system which practically effects a separation between the ownership of a railroad and its management. Where the ownership of a road is, there both the safety of travelers and the certainty of traffic require that the responsibility of management should be also; and this consideration naturally suggests the question of State ownership of railroads.

In their second annual report (pp. 46-69), the Commissioners recommended the purchase by the State of the Fitchburg Railroad with a view to its ultimate consolidation with the Troy & Greenfield road, including the Hoosac Tunnel, which is now the property of the State; thus making a connected line of road from Boston to the Hudson, to be managed in the public interest by trustees selected by the Legislature, and affording a fair trial of the experiment of a public State railroad. The subject was carefully considered by the Railroad Committee of the last Legislature, and their report upon it is contained in Leg. Doc's., 1871, Senate, No. 276. In view of the elaborate manner in which the subject was discussed a year ago, it does not seem necessary to encumber the present report with anything more than a mere recapitulation of the argument.

The Commissioners took the ground that the experiment of cheap transportation was one of such vital consequence to Massachusetts that it ought unquestionably to be tried. It was, however, if thoroughly attempted, an experiment of doubtful issue which the officials of no private corporation would be justified in undertaking, except with the utmost caution, unless the State would guarantee their stockholders against loss. This of course could not be expected. The remarkable success which had attended the trial of similar experiments on the State railroads of Belgium attracted the notice of the Commissioners, and was described by them at some length in their report. They could see no reason why results of the same nature should not be arrived at through a similar process in Massachusetts; the industrial condition of the communities was certainly not unlike.

The real difficulty in the way of the experiment lay in the recognized fact that, as a rule, governments are notoriously less efficient than private parties as managers of any business undertaking. The necessary security against this, as the Commissioners believed, lay in carefully preserving the active competition between railroads; not, however, as hitherto attempted between roads all in the hands of private corporations, but between roads owned and managed by Government operating among and in direct competition with other roads owned and managed by private companies. In this division of management and the competition consequent upon it, and not in exclusive State ownership, the Commissioners thought they discovered the secret of the success of the Belgian system. In support of this opinion they quoted the official statement of the minister having charge of the State roads of Belgium to the effect that the result of the system of mixed public and private ownership was that "the State railways find themselves placed in constant comparison with the railways worked by private companies; on the one hand stimulating them to general improvement,

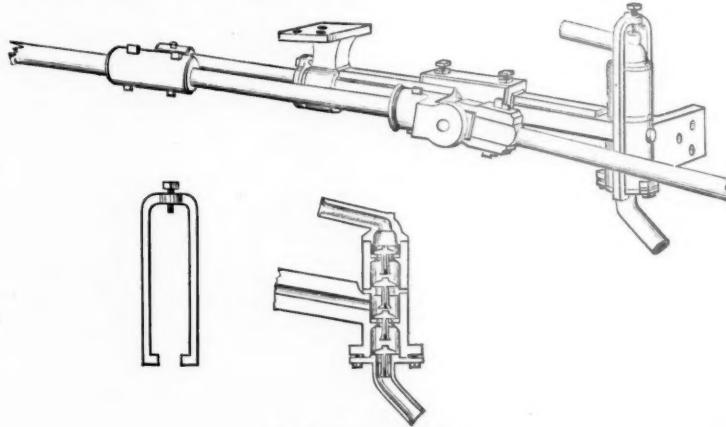


Fig. 5.—PUMP AND STIRRUP.

drivers and one-half on the four-wheeled truck. It also extended the wheel-base, making the engine much sturdier and less damaging to the track. Mr. William Norris, who had established a locomotive works in Philadelphia in 1832, was at this time building a six-wheeled engine with a truck in front and the driving-wheels placed in front of the fire-box. Considerable rivalry naturally existed between the two manufacturers as to the comparative merits of their respective plans. In Mr. Norris' engine, the position of the driving-axle in front of the fire-box threw on it more of the weight of the engine, and thus increased the adhesion and the tractive power. Mr. Baldwin, however, maintained the superiority of his plan, as giving a better distribution of the weight and a longer wheel-base, and consequently rendering the machine less destructive to the track. As the iron rails then in use were generally light, and much of the track was of wood, this feature was of some importance.

To the use of the ground joint for steam pipes, however, much of the success of his early engines was due. The English builders were making locomotives with canvas and red lead joints, permitting a steam pressure of only 60 pounds per inch to be carried, while Mr. Baldwin's machines were worked at 120 pounds with ease. Several locomotives imported from England at this period by the Commonwealth of Pennsylvania for the State road (three of which were made by Stephenson) had canvas and red lead joints, and their efficiency was so much less than that of the Baldwin engines, on account of this and other features of construction, that they were soon laid aside or sold.

In June, 1834, a patent was issued to Mr. E. L. Miller, by whom Mr. Baldwin's second engine was ordered, for a method of increasing the adhesion of a locomotive by throwing a part of the weight of the tender on the rear of the engine, thus increasing the weight on the drivers. Mr. Baldwin adopted his device on an engine built for the Philadelphia & Trenton Railroad Company, May, 1835, and thereafter used it largely, paying one hundred dollars royalty for each engine. Eventually (May 6, 1839) he bought the patent for \$9,000, evidently considering that the device was especially valuable, if not indispensable, in order to render his engine powerful, when required, as other patterns having the driving-wheels in front of the fire-box, and therefore utilizing more of the weight of the engine for adhesion.

In making the truck and tender wheels of these early locomotives, the hubs were cast in three pieces and afterward banded with wrought-iron, the interstices being filled with spelter. This method of construction was adopted on account of the difficulty then found in casting a chilled wheel in one solid piece.

April 3, 1835, Mr. Baldwin took out a patent for certain improvements in the wheels and tubes of locomotive engines. That relating to the wheels provided for casting the hub and spokes together, and having the spokes terminate in segments of a rim, as described in his patent of September 10, 1834. Between the ends of the spokes and the tires wood was interposed, and the tire might be either of wrought-iron or of chilled cast-iron. The intention was expressed of making the tire usually of cast-iron chilled. The main object, however, was declared to be the interposition between the spokes and the rim of a layer of wood or other substance possessing some degree of elasticity. This method of making driving-wheels was followed for several years.

The improvement in locomotive tubes consisted in driving a copper ferrule or thimble on the outside of the end of the tube, and soldering it in place, instead of driving a ferrule into the tube, as had previously been the practice. The object of the latter method had been to make a tight joint with the tube sheet; but, by putting the ferrule on the outside of the tube, not only was the joint made as tight as before, but the tube was strengthened, and left unobstructed throughout to the full extent of its diameter. This method of setting flues has been generally followed in the works from that date to the present, the only difference being that, at this time, with iron tubes, the end is wedged down, the copper ferrule brazed on, and the iron end turned or riveted over against the copper thimble and the flue-sheet, to make the joint perfect.

expected to follow the persistent adoption of each of these several methods. That by legislation is the one most familiar to all countries living under a representative form of government, and it has been systematically pursued from the first inception of the railroad system down to the present day both in England and America, as well as to a certain degree on the Continent of Europe. The great obstacle in the way of its practical success has been the excessive, if not insurmountable difficulty found in regulating a most complex and delicate system, subject to all sorts of vicissitudes and requirements, by laws of general application. Where the acts passed were simple and easily understood, as the many acts which have been passed in almost all the States of the Union regulating fares and freights at so much per mile for each passenger and for each ton of freight, they have in practice been found to work results so unanticipated, and in many cases so unreasonable, that such acts have proved hardly more than dead letters on the statute books. Nowhere has this system been more persistently followed out than in Ohio. Rates there have repeatedly been established by law for the carriage both of persons and of merchandise; the State Commissioner on Railroads and Telegraphs in his annual report expresses himself very distinctly on the practical operation of these laws. He says: "There is not a railroad operated in the State, either under special charter or the general law, upon which the law regulating rates is not, in some way, violated, nearly every time a regular passenger, freight or mixed train passes over it." He then proceeds to enumerate the laws and to point out the anomalies to which the enforcement of them must lead, and finally closes his comments with the remark that "a strict enforcement of these provisions would compel some companies ultimately to suspend business, prohibit the transportation of certain articles by rail, or compel their transportation below actual cost." (Annual Report 1870, pp. 6-8.)

The examination of the Commissioners into the practical operation of laws similar to those in force in Ohio in other States, has led them to believe that the experience of Ohio has not been exceptional. Simple and comprehensible laws have uniformly been found impracticable in application. Where, in order to avoid this difficulty, more complicated and discriminating statutes have been passed, the complexity of the system has uniformly, so far as the Commissioners are advised, caused the law when put into operation to break down under its own weight. Where special legislation has been resorted to, as has repeatedly been done in England, long tariffs and lists of charges covering all articles of merchandise transported by rail having been inserted in the charters of particular companies, it has been found that the development and necessities of trade have in practice, and even with common consent, nullified these provisions, which did not possess the flexibility absolutely requisite to the movements of modern commerce.

The only laws of this description, with which the Commissioners are familiar, which have practically been enforced, are those regulating by a fixed standard the carriage of persons by rail.

Of this class are the English statutes which compel on certain lines the running of what are known as Parliamentary trains,

and so called because run in accordance with Act of Parliament;

and in this country the laws prescribing rates of fare at so much per mile, the most familiar example of which is the two-cent rule on the New York Central Railroad.

In the case of the Parliamentary trains the end in view was a simple one. There is in England a vast population which is very poor and which cannot afford to travel to pay for a great rate of speed or for the best class of accommodation. The law was simply intended to compel the companies to provide certain slow and cheap trains at a low rate of fare for this poorer class of the community. This law was accomplished and this a similar law would accomplish in Massachusetts did a like exigency exist. In Massachusetts, however, there is yet no such well-defined separation of the traveling community into various classes.

The familiar law in force on the New York Central is, however, of a different character, and applies to all trains, descriptions of travel and rates of speed. No package, communiqué or season ticket is sold at any reduced rate, and consequently

ments, and on the other acting as a sort of check against any attempt to realize extravagant profits at the cost of the public." Mixed or competitive ownership and not exclusive State ownership was the essential principle of the experiment recommended by the Commissioners. The Commissioners saw no reason why such a system should not result in Massachusetts as it had in Belgium. The State road running side by side and in direct contrast with the private road would be held up to the highest standard of management, or it would prove a speedy failure and be disposed of; meanwhile, in case the experiment proved a success the private corporations would find themselves compelled to adopt any successful reform introduced on the public road as a necessity of competition. Neither in this case could the private companies complain that the test to which they were subjected was an unfair one, upon the ground that profit was immaterial to the public road, as the public road would necessarily be obliged to earn enough to pay the whole interest on its cost (the equivalent of 10 per cent. dividends at least on the capital stock of any competing road), or, if it failed to do so, the people of other sections of the State would refuse to be taxed for the purpose of running for a local benefit an unprofitable railroad.

The object the Commissioners had in view in making the recommendation as regards the Fitchburg Railroad contained in their last report, was to bring this important part of the discussion in which they were engaged prominently and as a definite proposition before the public. This accomplished, they have no further duty to perform. In making their recommendation of a year ago the Commissioners called attention to the fact that it is their province to deal exclusively with material considerations, and it is for others to weigh political objections. They used the following language upon this point: "There are also very grave political considerations involved. The principle upon which our Government is founded—that of least possible governmental interference and largest possible individual development—has a strong hold on the popular mind. The public opinion of the Commonwealth unquestionably accepts with great reluctance any measure calculated to bring industrial enterprises within the influence of politics. * * * The political considerations involved do not, however, fall within the province of this Board; it is for the Commissioners simply to recommend that course which is, in their opinion, best calculated to certainly and safely reduce the transportation tax; and it is for the people and their direct representatives to decide whether the advantages likely to flow from that policy are or are not counterbalanced by the dangers to our political system involved in it. The problem before the Commissioners is a purely material one, and it is for another tribunal to weigh ulterior and political considerations." (Report 1870, pp. 60-1.)

It would, of course, be extremely impolitic for the Commonwealth to hurry into so costly and complex an experiment as the purchase of even a minor line of railway, before public opinion has fully and calmly settled down into a conviction of both the necessity and the propriety of such a measure. However clear the minds of the Commissioners may be on this subject, they are fully aware that it is still a novelty in the minds of many; it is no part of their duty to in any way attempt to precipitate a decision on any point connected with this railroad question; whatever is done should be done only after full discussion and a thorough sifting of arguments. As regards this matter of the State ownership of some line of railway, having sufficiently set forth the line of reasoning and the precedents which led them to make the recommendation contained in the previous report, there is no apparent reason why they should now devote further space to the subject.

3. It now only remains to consider the last of the three modes suggested, through which it might be hoped that any public policy could be engrafted on a private railroad system;—through the results gradually but inevitably brought about in this country by the force of public opinion making itself felt through discussion and the recognized official channels.

The Commissioners are not prepared to say that this may not be a remedy adequate to every present emergency, and the results of their labors during the last year would seem, they believe, to go far toward warranting such a conclusion. It must be remembered that Massachusetts was never so prosperous as now;—and while there is good reason to believe that a more public-spirited management of certain of our railroads would greatly tend to stimulate that prosperity, yet time must be allowed for such a management to develop itself, and it is only within the last two years that these questions have been systematically investigated. Public opinion as yet has had no sufficient time in which thoroughly to inform itself, and to concentrate upon some definite statement of what is demanded. To ascertain this demand, and to formulate it, has always been held by this Commission to be the most important of its functions. When this shall have once been fully accomplished, there can be little doubt that the companies will make every reasonable concession. In many respects, particularly as compared with some other States of the Union, Massachusetts is very fortunate in those who control her individual railroad corporations. They are, almost without exception, men of standing and character. The relations of the Commissioners with these officers have hitherto been very harmonious, and every recommendation which they have made has received a consideration at least respectful and fair. It shall be no fault of the Commissioners if these relations do not continue to exist. They certainly have no disposition to interfere, any further than a faithful construction of the laws under which they act shall compel them to, in the minor details of railroad management. If this Board is to fulfill its mission, it must be through its successful dealing with general questions in a large spirit of the public service, and it can only waste its strength by inviting strifes on matters of lesser consequence. Neither as regards the larger issues would it be reasonable to expect that officials of great experience and high standing in their profession should implicitly accept every suggestion emanating from a Board of comparatively recent creation, and whose position can only be established through the gradual results of its labors. Up to the present time, however, the Commissioners have seen no good cause for discouragement. They believe that they have already succeeded in establishing a public policy which meets with popular acceptance, and this policy has already been sufficiently adopted by the railroad corporations to insure for it a trial of moderate fairness. Should it succeed under present conditions, and should public opinion demand a further extension of this policy, it will doubtless be conceded. In America the force of public opinion is well-nigh irresistible, and the experience of the Commissioners has convinced them of the fact that railroad officials, as a rule, are peculiarly sensitive to it. It is only necessary to convince them that it is aroused and that it will not die out. For this reason, if the people of Massachusetts are now laboring under any grave inconvenience of railroad management the Commissioners feel constrained to say that the people are themselves mainly responsible for them. It is not easy for those who have not had personal experience to understand the difficulty which a public official, such as a member of this Board, meets with in getting any cause of complaint presented in such a tangible form that he can base any action or representations upon it. Manufacturers, men of business and travelers stop them in the streets and enter into angry complaints, or they write letters presenting detached facts requiring further investigation. In the vast majority of cases the matter ends here. No effort of the official will bring forth any evidence on which action can be based. The complainant is either busy and will not afford the time to make his grievance specific, or, where the difficulty is a radical one, he rather prefers to bear it than to undergo the

trouble and inconvenience necessary to remedy it. Yet no case has yet come before this Commission and been regularly examined into and brought to the notice of a railroad corporation, with a distinct recommendation of a remedy, that a sufficient measure of relief has not in consequence been conceded.

The Commissioners have endeavored in this report clearly to indicate their opinions upon every subject which has presented itself. They are fully sensible, however, that it is the Legislature which must either approve the course hitherto pursued, or indicate such other course as may better commend itself to its judgment. In any case, whatever policy is indicated will receive the active support of this Board, with a view to giving it a fair and unprejudiced trial. Meanwhile, should no intimation of a desire to enter upon some other line of action be given, the Commissioners propose during the coming year to follow up as energetically as they may that policy which has been developed in the course of this report. They propose carefully to observe the results of the experiments which have already been initiated, and to keep the public and the several corporations fully informed as regards them. Should they result in a success, it may fairly be hoped that progress in the same direction will in the future be much more rapid, and that it will in the end be found that both the Massachusetts community and the Massachusetts railroad corporations have entered upon a period of greatly increased prosperity.

THE AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.

Report of the Fifth Annual Convention.

[CONTINUED FROM PAGE 251.]

MEMBERS IN ATTENDANCE.

The following is a list of the members who were present at this session:

H. Anderson	Chicago (late of Chicago & Northwestern)
H. M. Britton	White Water Valley Railroad
J. M. Boon	Pittsburgh, Fort Wayne & Chicago
H. C. Braslow	Lehigh & Susquehanna
H. L. Brown	Erie Railway
R. C. Blackall	Albany & Susquehanna
George E. Boyden	Boston, Hartford & Erie
H. G. Brooks	Brooks Locomotive Works, Dunkirk
H. E. Chapman	Cleveland & Pittsburgh
G. A. Coolidge	Fitchburg Railroad
H. D. Clark	Lehigh Valley
H. L. Cooper	Kansas City, St. Joseph & Council Bluffs
R. Colburne	Norwich & Worcester
James Cooke	Danforth & Cooke Locomotive Works
A. H. De Clercq	Toledo, Peoria & Waukegan
J. F. Devine	Wilmington & Weldon
T. S. Davis	Williamsport & St. Paul
Wilson Eddy	Boston & Albany
Harry Elliott	Ohio & Mississippi
P. Evans	Catawissa & Fogleville
John U. Eastman	Nash. & Chattanooga and Nash. Northwest's
John C. Ellis	Schenectady Locomotive Works
C. L. Eastman	Concord Railroad
Howard Fry	Grand Trunk of Canada
M. N. Forney	Railroad Gazette (Associate)
John H. Flynn	Western & Atlantic
William Fuller	Atlantic & Great Western
J. N. Foss	Vermont Central
E. B. Gibbs	Pacific (Missouri)
C. Graham	Lackawanna & Bloomsburg
G. W. Glass	Allegheny Valley
Edwin Garfield	Hartford, Providence & Fishkill
J. B. Gregg	Erie Railway
R. D. Grant	late of Rockford, Rock Island & St. Louis
W. H. Griggs	New York & Oswego Midland
W. E. Granger	
S. J. Hayes	Illinois Central
E. O. Hill	Erie Railway
C. T. Ham	late of New York Central & Hudson River
Nathaniel Hayes	Washington & Ohio
W. S. Hudson	Rogers' Locomotive Works, Paterson
O. A. Haynes	St. Louis & Iron Mountain
J. Johann	late of Pacific, or Missouri
Wm. Jackson	Rome, Watertown & Ogdensburg
J. Kelly	Providence & Worcester
A. J. Keenan	Dayton & Union
Thomas Kerr	Camden & Amboy
S. Keefer	Flint & Pere Marquette
B. H. Kidder	Lake Shore & Michigan Southern
J. L. Loney	Louisville, New Albany & Chicago
J. N. Lander	Northern of New Hampshire
H. L. Leach	Hinkley Locomotive Works, Boston
H. A. Little	late of Peoria, Pekin & Jacksonville, Philadelphia
S. Moore	Pittsburgh, Fort Wayne & Chicago
J. McElroy	Oil City & Allegheny
A. G. Maynes	Selma, Rome & Dalton
G. F. Morse	
J. N. Martin	Evansville, Terre Haute & Chicago
J. W. Neabitt	
Warren Noyes	Maine Central
J. W. Philbrick	Cheshire & Ashuelot
F. A. Perry	Philadelphia, Wilmington & Baltimore
G. W. Perry	Taunton Branch
W. M. Parks	Leavenworth, Lawrence & Galveston
P. J. Philbrick	Catavissa Railroad
P. J. Perrin	Central of New Jersey
A. J. Prescott	Boston & Providence
T. W. Peeples	Great Western of Canada
C. B. Perry	Atlantic, Mississippi & Ohio
G. Richards	Pennsylvania Railroad
W. A. Robinson	Port Huron & Lake Michigan
J. T. Robnett	Little Miami
Robert Stewart	Lake Shore & Michigan Southern
Morris Sellers	Pennsylvania Railroad
J. H. Setchel	New York & Harlem
W. T. Smith	Manchester & Lawrence
James Sedgley	Philadelphia & Erie
C. B. Street	Pennsylvania Railroad
W. M. Strong	New York & Harlem
A. J. Sanborn	Eastern of Massachusetts
St. Louis, Terre Haute & Indianapolis	
Coleman Sellers	Manchester & Lawrence
H. A. Towne	Philadelphia (Associate)
John Thompson	Connecticut River Railroad
Chas. R. Piddle	Hannibal & St. Joseph
J. K. Taylor	Old Colony & Newport
Chas. A. Thompson	Long Island Railroad
A. B. Van Tuyl	Indianapolis
Reuben Wells	Boston & Albany
J. E. Wiggins	Jeffersonville, Madison & Indianapolis
E. A. Waite	late of Boston, Hartford & Erie
W. Woodcock	Boston & Maine
J. L. White	Philadelphia, Germantown & Morrisville
J. E. Waddy	Evansville & Crawfordsville
L. S. Young	Orange, Alexandria & Manassas
	Cleveland, Columbus, Cincinnati & Indianapolis

NEW MEMBERS.

The following is a list of those who have joined the Association since the last annual convention:

John H. Flynn	Western & Atlantic
R. C. Blackall	Delaware & Hudson
Archie Thomson	Ohio & Mississippi
E. H. Marsh	South Carolina
Andrew J. Prescott	Catavissa Railroad
William H. Stearns	Connecticut
William Fuller	Atlantic & Great Western
W. Noyes	Grand Trunk
T. W. Peeples	Central of New Jersey
Albert Griggs	Worcester & Nashua
Charles R. Piddle	Vandalia Line
John S. Whitworth	
W. A. Alden	Connecticut & Passumpsic Rivers
B. W. Healey	Rhode Island Locomotive Works
John Y. Smith	(late of Smith & Dawson's Loco. Works) Pitts.
Gordon H. Nott	Civil Engineer (Associate Member)
A. B. Underhill	Boston & Albany
P. A. Logan	European & North American
Matt. P. Wood	Cincinnati & Terre Haute
D. T. Davis	Vermont & Mass. and Troy & Greenfield
C. L. Eastman	Concord Railroad
J. N. Foss	Vermont Central
J. H. Anderson	Stonington & Providence
William E. Granger	Utica & Black River
George E. Boyden	Boston, Hartford & Erie
George W. Cushing	Northern Pacific
H. G. Brooks	Brooks Locomotive Works, Dunkirk
J. N. Martin	Grand Trunk
Thomas Jones	Grand Trunk of Canada

SECOND DAY.

The second day's session of the American Railway Master Mechanics Association was begun in Horticultural Hall, Wednesday morning, June 12, at nine o'clock. After the usual opening exercises, the question of punching or drilling the holes in locomotive boiler plates was taken up from Tuesday's discussion.

DRILLED AND PUNCHED BOILER PLATES.

Mr. Hayes gave estimates of the relative cost of each method, and favored drilling. He believed the cost of a boiler would not be increased more than \$25, while much was gained in strength by this means.

Mr. Forney thought that more boilers gave way at the rivets than at the seams. It was also easier to match the holes of drilled plates than punched ones.

Mr. Hudson, of the Rogers Locomotive Works, believed other considerations should be taken into account in settling this question, for his experience was that boilers did not generally give way from hole to hole; and he thought it would be far better if they could get cylindrical pieces made as tires are. He considered the English practice better than the American in some respects.

Mr. Gregg, of the Erie Railway, was of opinion that further experiments should be made to determine fully all the advantages on one side of the other. Mr. Forney, of the RAILROAD GAZETTE, thought there was evidence that breakage occurred at rivet holes.

Mr. Philbrick, of the Maine Central, had found always, in case of disaster, that there seemed to be a previous weak point in the boiler, in some of the stays and seams.

Mr. Hayes, of the Illinois Central, again spoke in favor of drilling. As a riveted edge was ordinarily only about 56 per cent. as strong as the rest of the iron, everything possible should be done to equalize the strength.

Mr. Eliot said it was of little consequence why a rivet sheared quicker in a punched than a drilled hole. It was only necessary to know from the experiment made that the latter gave 30 per cent. the most strength.

Mr. Hudson had not been fully convinced that so much additional strength was obtained. He thought favorably of "butting" instead of lapping the plates, and then riveting wide plates upon both sides. He did not believe any change in the method of making holes would materially prevent accidents by strengthening the boiler. His experience was that the boiler gave way in the weakest points through want of staying, etc., rather than from weakness at the rivet holes.

Mr. Setchel, of Cincinnati, the Secretary of the Association, gave his testimony that he never saw an exploded boiler that had been burst in the seams.

Mr. Gorman, of Toledo, did not think one out of ten boilers which gave way did so because of explosions. There was as much difference between explosions and bursting as between day and night.

FLUE SHEETS.

The next sub-topic was then taken up, the committee expressing an opinion that back flue sheets of locomotives should be of $\frac{1}{2}$ -inch iron or $\frac{1}{4}$ steel, and front flue sheets of $\frac{1}{4}$ iron or $\frac{1}{2}$ steel. The topic was not discussed.

STAY BOLTS.

In the next topic, the committee advised the use of hollow stay bolts.

Mr. Hudson said his experience was that the only way to make reliable hollow stay bolts was by drilling them out.

STRAIGHT AND WAGON-TOP BOILERS.

The subject of "the relative merits of the straight and wagon-top" locomotive boilers was taken up and the report of the committee was read. A large majority of those who had replied to inquiries preferred the latter boiler as carrying water better, presenting more heating surface and giving about equal steam room, with dryer steam. A long communication was read from Mr. H. A. Towne, of the Hannibal & St. Joseph road, arguing that the wagon-top boiler was the best.

Mr. Elliott thought the matter had been overstated. The strength of the straight boiler, he considered, was a great advantage in its favor. Four out of five cases of explosions in his experience originated in the wagon-top.

The discussion was continued by Mr. Towne, who demonstrated his arguments and theories by drawings, and by Mr. Elliott, and by Mr. Johann, of the Missouri Pacific Railroad, each in favor of the straight boiler. Mr. Hayes, of the Illinois Central, believed the straight boilers to be stronger and cheaper, but it was often desirable in the West to use the wagon top on account of the impure water, and the necessity of entering them to clean them. Mr. Hudson expressed a preference for the wagon-top, not as strong, generally, but it can be made so; and Mr. Robinson, of the Great Western, stated, as the result of English experience, that the wagon-top had generally been abandoned.

Mr. Wells, of Jeffersonville, Ind., gave his experience in the use of the wagon-top boilers and his method of staying them for safety and strength, while he preferred the straight boilers on the largest locomotives.

Mr. Hayes, of the Illinois Central road, admitted that the straight boiler was cheaper and stronger, but out West where there was so much incrustation it was better to have the wagon-top in order to reach the interior for cleaning purposes.

Mr. Robinson said that in Europe straight lines and circles were preferred after a long trial, and the fact was that now not ten per cent. of the locomotive boilers there used were of the wagon-top shape. It was moved that the question be put to show the sense of the convention on the subject, in relation to the preference for either style, on four driving-wheel engines, and 28 were found for the wagon-top against 13 for the straight boiler. A recess of ten minutes was then taken.

SLIDE-LATHE.

On reassembling, a paper was read by Mr. Coleman Sellers, of Philadelphia, associate member, treating of the "self-acting slide-lathe." The paper proved to be a very interesting and valuable one, and a vote of thanks was passed to Mr. Sellers and the paper placed on file.

FINANCES.

The Committee on Finance made a report, showing an indebtedness of members of \$421, with cash assets on hand of \$261, and recommended an ASSESSMENT of \$10 upon members.

INVITATIONS.

Invitations were read to visit the Masonic Temple in Boston, the Stevens Institute of Technology, Hoboken, N. J., and to pass over the Boston & Maine Railroad, for which votes of thanks were passed.

SUBJECTS FOR NEXT MEETING.

The Committee on Subjects for Consideration at the next Annual Convention reported the following, the committees for each being appointed afterward, as given below:

1. *Locomotive Boiler Construction*—S. J. Hayes, Illinois Central; J. Lacey, Louisville, New Albany & Chicago; J. B. Gregg, Erie Railway, Committee.

2. *The Operation and Management of Locomotive Boilers, including the Purification of Water*—H. A. Towne, Hannibal & St. Joseph; A. H. De Clerc, Toledo, Peoria & Warsaw; Harry Elliott, Ohio & Mississippi, Committee.

3. *The Comparative Value of Anthracite Coal, Bituminous Coal and Wood for Generating Steam in Locomotives*—Chas. Graham, Lackawanna & Bloomsburg; L. S. Young, Cleveland, Columbus, Cincinnati & Indianapolis; B. H. Kidder, Lake Shore & Michigan Southern, Committee.

4. *The Construction, Operation and Cost of Maintaining Continuous Train-brakes*—J. M. Bon, Pittsburgh, Fort Wayne & Chicago; J. Johann, late of Missouri Pacific; W. S. Hudson, Rogers Locomotive Works, Committee.

5. *The Relative Cost of Operating Roads of Gauges of 3ft. 6in., or less, and those of the Ordinary 4ft. 8in. Gauge*—J. T. Robinson; Atlantic, Mississippi & Ohio; J. U. Eastman, Nashville & Chattanooga; W. Bell Smith, South Carolina Railroad, Committee.

6. *The Construction and Operation of Solid-end Connecting Rods for Locomotives*—J. Sedgley, Lake Shore & Michigan Southern; J. W. Nesbitt, Evansville, Terre Haute & Indianapolis; J. L. White, Evansville & Crawfordsville, Committee.

7. *Resistances of Trains on Straight and Curved Tracks, and on Wide and Narrow-gauge Roads, and with Four or Six-wheeled Trucks, and with Long and Short Wheel-base*—W. A. Robinson, Great Western of Canada; Wm. Jackson, Rome, Watertown & Ogdensburg; C. T. Ham, New York Central & Hudson River, Committee.

8. *The Efficiency of Check or Safety Chains on Engine, Tender and Car Trucks in Lessening the Danger Resulting from Running off the Track*—R. Wells, Jeffersonville, Madison & Indianapolis; C. R. Peddle, St. Louis, Vandalia, Terre Haute & Indianapolis; J. L. White, Evansville & Crawfordsville, Committee.

9. *Machinery for Removing Snow from the Track*—J. W. Philbrick, Maine Central; J. N. Foss, Vermont Central; E. Studley, Concord Railroad, Committee.

10. *The Machinery and Appliances for Supplying Fuel and Water to Locomotives*—H. L. Leach, Hinckley & Williams Locomotive Works; Wilson Eddy, Boston & Albany; E. Garfield, Hartford, Providence & Fishkill, Committee.

11. *The Machinery and Appliances for Removing Wrecks and Erecting Bridges*—Morris Sellers; D. O. Shaver, Pennsylvania Railroad; S. Moore, Pittsburgh, Fort Wayne & Chicago, Committee.

12. *The Best Form and Proportions of Axles for Cars and Locomotives, also Whether there is Anything to be Gained by the Use of Compound Axles and Loose Wheels*—M. N. Forney, Coleman Sellers, Gordon H. Nott, Committee.

The committee recommended to the consideration of the Association the advantages which would accrue from offering a premium for the best design and drawing of machinery for accomplishing the removal of wrecks, erecting bridges, and removing snow.

To these recommendations of the committee was added the subject of safety valves, "and the best form and proportions of axles, and what gain in using compound axles and loose wheels, safety valves and slide valves."

AMENDMENT TO THE CONSTITUTION.

An amendment was made to the constitution to allow the admission of two mechanical engineers or representatives of locomotive establishments, instead of one, and several new members were proposed for admission.

BOILER INCURSTATIONS.

The report of the committee on boiler incrustations was read, noticing the great injury done to boilers by the use of impure water, and proposing means of getting pure water on all occasions. The report seemed to meet with much favor and was received and placed on file.

VARIOUS REPORTS.

The report on the lap and lead of slide valves was next read, and a committee appointed to consider the subject and report at the next annual meeting.

A report on the best method of securing driving and truck brasses was read, stating that communications had been received on the subject from thirty-five mechanics, giving a wide range of opinions; accepted.

A report from the committee appointed to consider the question, "Is there any material or device more economical for packing stuffing-boxes than hemp?" was read. Hemp was considered the best, as no danger from fire is felt, this material standing 500 deg. of heat, while steam reached only 343 deg. Recommended a continuance of the subject another year. Report received.

The report on adopting a uniform system of computing mileage for engines doing switching service was read, and strongly recommended that such a system be adopted in place of the widely-differing manner now in use. Report accepted. The convention was then adjourned.

EXCURSION IN BOSTON HARBOR.

In the afternoon the Association were the guests of the Bay State Iron Company, and the entertainment was a harbor excursion. At three o'clock the company, which numbered about three hundred and included ladies, took the steamer *Mata* at India wharf, the Germania band accompanying them. The excursion was extended to Minet's Lodge light, and the boat returned to the city at about half-past seven. The weather was favorable for the occasion except during the last hour, but a rare sunset scene more than compensated for the inconvenience caused by the rain. A good collation was served during the trip. On the way down a short stop was made at the works of the Bay State Iron Works at South Boston, where the process of making plate iron was witnessed. The excursion was under the direction of Mr. John H. Reed, Treasurer of the company, and was excellently managed in all respects, and the officers of the boat did all in their power for the comfort and pleasure of the party.

THIRD DAY.

The third day's session was commenced in Horticultural Hall, at nine o'clock Thursday morning.

COMPUTING MILEAGE IN SWITCHING.

On being called to order the matter of adopting a uniform system of computing mileage for engines doing switching ser-

vice was taken up from Wednesday's discussions. The report of the committee recommended that six miles per hour be allowed for the time engines are in actual use; that for engines running local freight trains six per cent. addition to the train mileage be allowed for switching, and that for engines running through freight or passenger trains no mileage be allowed for switching.

The discussion turned at first upon whether the noon hour should be included in the computation. Messrs. Young, Towne, Setchel, Hayes and others spoke on the subject, giving various opinions and differing experiences. The number of miles per hour on different roads was stated to vary from 2½ to 10 miles per hour, and while this was the case the Master Mechanic of one road could not present to his Superintendent as good an apparent result as the one on another road, when he was obliged to allow a very different rate of mileage. The report of the committee was favorably received by nearly all the speakers, and it was adopted unanimously. A resolution was adopted that the Secretary be instructed to communicate with the Superintendent's Association with a view to establishing such a uniform system.

COMPRESSION BRAKES.

The report on the application of compression brakes was read, giving opinions received from a large number of correspondents favoring variously each of the well-known brakes, such as the "Creamer," "Westinghouse," etc. Mr. Setchel, of the Little Miami Railroad, said that whatever advantages were gained by the air brakes, the saving in wear of wheels was certainly not one of them. Mr. Elliot, of the Ohio & Mississippi, thought the air brakes could be applied with just force enough not to slide the wheels, and thus was the result they wanted to arrive at. He moved the matter be continued for discussion to next year. Carried. Mr. Hayes had seen wheels ruined in one trip by common hand brakes in the hands of unskillful men, but had no trouble with the Westinghouse brake. Mr. Setchel said the Westinghouse brake had saved treble its cost in the saving of stock and was a great preventive of loss of life. The sliding of the wheels was the fault of the engineers and not of the brake. After further discussion by Mr. Eddy, of the Boston & Albany, Mr. Hudson, of the Rogers Locomotive Works, Mr. Robinson, of the Canada Great Western, Mr. Coolidge, of the Fitchburg, Mr. Sedgley, of the Lake Shore, Mr. Morris Sellers, Mr. Peddle, of the Vandalia line, Mr. Wells, of the Jeffersonville, Madison & Indianapolis, Mr. Gregg, of the Erie, Mr. Elliot, of the Ohio & Mississippi, Mr. Glass, of the Allegheny Valley, Mr. Keefer, of the Flint & Pere Marquette, and Mr. Forney, of the RAILROAD GAZETTE, the discussion was closed and the report accepted and placed on file.

A recess of ten minutes was then announced.

On reassembling, a paper was read by Mr. Gordon H. Nott on "The Application of Fuel in the Generation of Steam," for which a vote of thanks was tendered; after which a list of committees on subjects for consideration at the next annual meeting was read by the President, as given in connection with the subjects above.

BOILER INCURSTATIONS.

The report of the committee on boiler incrustations, left over from the day before, was read. This document was read by Mr. Setchel, Secretary of the Association, and occupied thirty minutes in its delivery. It expressed the belief that the boiling of the water previous to its use in locomotives would separate the sediment from the water, and obviate, in a large degree, the trouble now felt from incrustations. On some of the Western railroads the loss by these incrustations was no less than \$75,000 per year for each one hundred locomotives. Mr. Coleman Sellers, of Philadelphia, called attention to the fact that the entirely pure water was more injurious to boilers than that which was slightly impregnated with salts or some foreign substance, and stated that on one occasion the boiler of a steamer which used distilled water was nearly ruined in one trip thereby. The report of the committee was then accepted and placed on file. Mr. Towne, of the Hannibal & St. Joseph Railroad, chairman of the committee, made a statement of the state of the water on his road. It was voted to communicate with the Stevens Institute of Technology in reference to sending them samples of boiler incrustations for their consideration. Mr. Hayes, of the Illinois Central, mentioned a plan used for several years on his road which seemed to help the matter, and hoped the railroads would feel disposed to appropriate money for experiments on the subject. Mr. Gorman, of the Toledo, Wabash & Western road; Mr. Hudson and Mr. Robinson, of the Great Western of Canada, and Mr. Boon, of the Pittsburgh, Fort Wayne & Chicago, followed, and the discussion was then closed.

EIGHT AND TEN WHEEL ENGINES.

The report on "the comparative cost of operating eight and ten-wheel locomotives" was then read. From sixteen railroads heard from it was found that eight and ten-wheel locomotives cost for repairs, respectively, 4.11 and 5.78, fuel, 9.53 and 11.23; stores, .85 and 1.05; and that the tone hauled in proportion to weight of engines was greatly in favor of the eight-wheel engines.

SIX AND FOUR-COUPLED DRIVERS.

The report on "the comparative performance and cost of operation of ten-wheeled engines with six drivers coupled, and eight-wheeled engines with four drivers coupled" was read, showing that the Mogul engine (eight-wheel) can be run for 33 per cent. less than the others, and they recommend them as best adapted for freight work.

SAFETY VALVES.

The committee on safety valves made a report, in which they recommended the Richardson valve in connection with one of the old styles, the former to be arranged so as to be out of the control of the engineer, and the latter to blow off steam at stations.

NEXT PLACE OF MEETING.

The committee on a place of meeting for this Association next year was read. The vote was taken by ballot, resulting as follows: New York 17, Cincinnati 5, Baltimore 26, St. Louis 21, Chicago 4 and Cincinnati 8. The vote to take the vote by ballot was reconsidered, and Baltimore selected unanimously.

The convention then adjourned until seven o'clock in the evening.

EXCURSIONS.

In the afternoon the members of the convention took carriages for the suburbs, a portion of them visiting Chestnut Hill and Fresh Pond, while the others went to the Navy Yard, Bunker Hill and Fresh Pond, all returning to the American House.

EVENING SESSION.

In the evening, Mr. Britton in the chair, the first business was the reception of the report of the Committee on Associate Members. F. B. Miles, of Philadelphia; Professor R. H. Thurston, of Hoboken, N. J.; Henry Morton, of Hoboken; and Messrs. J. O. D. Lilly, of Indianapolis; and Jerome Wheelock, of Worcester, were chosen. Mr. B. R. Tighe, of Boston, was rejected, it being suggested that it was poor policy to elect men who are not master mechanics, except scientific men.

BOILER EXPLOSIONS.

The report of the Committee on "Boiler Explosions" was read by the Secretary. The conclusion reached by the committee was that many of the explosions were caused by the use of impure water, but that most of the explosions could not be accounted for.

Mr. Gorman said that he thought one cause of explosions was

the retention of latent heat by water which was not in motion, and that when the water was put in motion steam was suddenly generated, causing great pressure.

PROMOTION OF FIREMEN AND GRADES OF ENGINEERS.

The report of the Committee on a "Uniform system of promotion of firemen to engineers and the establishment of grades of engineers," was read by the Secretary. The committee find that promoted firemen are preferred to men promoted from shops. There is already a system of grades of engineers, based upon length of service. The subject was discussed at some length.

Mr. Hayes said he did not believe in grading engineers, because if an accident occurred a lawsuit would be likely to result more injuriously to the company, if the lawyer found that an engineer graded as second-class was running.

Mr. Gorman held the same views as to grading. He didn't believe in examinations, because men could learn the answers to a series of questions without knowing much about their work.

The subject was further discussed by Messrs. Robinson, Elliot, Flynn and Hudson, the general opinion expressed being that firemen made better engineers than machinists did.

Messrs. Robinson, Clark and Flynn were appointed a committee on resolutions. The subject of boiler explosions was taken up.

EXPLOSIONS AGAIN.

Mr. Sellers then gave a most interesting account of experiments made on boilers to ascertain the cause of explosions, and he gave as his opinion that these occurred in almost all cases from weakness of the material, for he had often heated boilers red-hot and then forced in cold water, and in no case had any explosion occurred, as the water would invariably cool the boiler. Mr. Philbrick, of Waterville, Me., related his experience in the matter of explosions, but nothing new was elicited.

THANKS.

The Committee on Resolutions presented a report tendering the thanks of the Association to the Bay State Iron Co., and to the Committee on Reception for the delightful drive about the city and the visit to the Boston Theatre, to the Rhode Island Locomotive Works, the Boston & Providence Railroad and the New Hampshire Railroads for courtesies extended, as also to the city press for their attention during the visit of the Association, and the report was accepted and the resolutions adopted.

OFFICERS TO HOLD OVER.

It was voted to postpone the election of officers to the next annual meeting, which necessitated the holding over of the present officers for another year.

FUND FOR PREMIUMS.

A fund was started to be given as premiums at the next annual meeting for the best design for removing snow from railroad tracks, also for the best means of supplying locomotives with fuel and water, Mr. Forney of the RAILROAD GAZETTE being the originator of the fund.

The following gentlemen afterwards contributed to this fund: Mr. Robinson of the Great Western of Canada, Mr. Hudson of the Rogers Locomotive Works, Mr. Flynn of the Western & Atlantic, Mr. Nott of Boston, Mr. Blake of Cincinnati, Mr. Snow of Ramapo, Mr. Williams of Utica, and Mr. Sellers of Philadelphia.

RECONSIDERATION.

The vote by which the report of the Committee on Boiler Explosion was accepted was reconsidered, as there was a feeling that it was too important a question to be decided hastily, and the report was laid on the table.

MISCELLANEOUS.

Notice was given that the convention would leave for Rocky Point on Friday morning, at 11:15, from the Providence depot, returning in the evening, and leaving for New Hampshire on Saturday morning.

Messrs. Perry, Williams and Woodcock were appointed a Committee of Arrangements for the next annual meeting.

After a vote had been passed to pay the Secretary \$500 for his services during the year the thanks of the convention were tendered to Mr. H. M. Britton for the business-like and gentlemanly manner in which he had conducted the session, to which compliment Mr. Britton very happily responded.

The convention was then adjourned to meet at Baltimore on the second Tuesday of May next.

AFTER THE SESSION.

FRIDAY'S EXCURSION.

On Friday, the members of the Association, accompanied by their wives, made an excursion to Rocky Point, leaving Boston at 11 a. m. A quick run was made to Providence, where they took passage on a steamer and went down the bay past Bristol and afterward returned to Rocky Point. They were joined at Providence by the American Brass Band. To the music of the band they marched around the island on their arrival at Rocky Point, and afterward entered the dining hall, where they were provided with a Rhode Island feast of clams, cooked in various styles, and baked fish, etc. A speech of welcome was made by Governor Padelford, of Rhode Island, and Mayor Doyle, of Providence, followed in some complimentary and congratulatory remarks. Responses were made by President Britton and others of the Association. After the dinner a dance was enjoyed on the green to the music of the band. The entertainment was at the expense of the Rhode Island Locomotive Works of Providence, and was enthusiastically praised by the recipients.

SATURDAY'S EXCURSION.

On Saturday a large number of the members of the Association and invited guests were taken by a special train on an excursion (via Lowell Railroad) to the Pemigawasset House, Plymouth, N. H. A band was provided, and a better humored party never rode on a rail. At Nashua the members were switched off to see the process of rolling steel tires at the works of the Nashua Iron Company. All seemed very much interested in the process, the ladies included. After a lunch the members and their friends re-embarked and proceeded joyously on their way.

The train and engine were equipped with "The American Vacuum Brake," the invention of Mr. J. Y. Smith, of Pittsburgh. A number of experiments were made with it in stopping trains. The time occupied in bringing the train to a full stop at speeds from 25 to 30 miles per hour, varied from 26 to 30 minutes, and the distance from 672 to 1,152 feet. The general construction of the brake is analogous to that of the Westinghouse, the power employing a vacuum, instead of that due to compressed air.

The excursionists reached Plymouth about seven o'clock in the evening and fared sumptuously. The whole of the next day was spent there, and the time employed in sailing and riding, and by some of the younger and unmarried in the very unmechanical occupation of talking sweet words of nonsense to the gentle sex.

Some of the excursionists returned to Boston on Sunday night, but the majority remained until Monday morning. Of these a small number went to the White Mountains, but nearly all turned their faces homeward.

All the arrangements for this convention were of the most perfect kind, for which the Association are indebted to the very excellent Committee of Arrangements for the reception, and especially to its Secretary, Mr. H. J. Hooton, who was ubiqui-

ons and untiring. The following gentlemen composed the Reception Committee: H. L. Leach Superintendent Hinkley & Williams Works, Geo. B. Stetson of Lazell, Perkins & Co., F. A. Howard (Treasurer) of Abbott & Howard, E. C. Perkins of Nashua Iron Co., H. F. Hoxton (Secretary) of W. Bailey, Lang & Co. (the above forming the Finance Committee); James Simon of Boston Forge Co., H. K. Moore of American Steam Gauge Co., Ralph Crooker of Bay State Iron Works, John B. Tait Agent Taylor Bros., M. A. Herrick Treasurer Nashua Iron Co., B. W. Healy Superintendent Rhode Island Locomotive Works, Aretas Blood of Manchester Locomotive Works, J. H. Belcher of Naylor & Co., L. P. Hunt of Hussey, Wells & Co., R. London of Loudon, Tower & Co., W. G. Cotton American Tube Works, Henry Sherburne of Sherburne & Co., Samuel May, Jr., of May & Co., C. C. Loring of Loring & Wales Bros., A. S. Gear of A. S. & J. Gear.

THE MASTER CAR-BUILDERS.

Report of the Sixth Annual Convention, held in St. Louis, June 12 and 13.

The sixth annual meeting of the United American Railway Master Car-Builders' Association commenced its session at the Southern Hotel, St. Louis, June 12.

The meeting organized with President M. C. Andrews, of the New York & New Haven Railroad, in the chair, and the minutes of the previous meeting were read by the Secretary, L. Garey, of the New York & Harlem Railroad.

The following are the names of the members present at the session:

Milton Wilder, Erie Railway, Buffalo; John B. Ferris, Housatonic Railroad, Bridgeport, Conn.; S. Griffith, Indianapolis, Cincinnati & Lafayette, Cincinnati; J. C. Buckhout, New York & Harlem, White Plains, N. Y.; Josiah Stani, Fort Scott & Gulf, Wyandotte, Kan.; George Howe, New York Central & Hudson River, Niagara Falls; J. W. Holmes, Atlantic & Great Western, Galion, O.; W. H. Johnson, New Orleans, Mobile & Texas, Mobile; Joseph Townsend, Missouri, Kansas & Texas, Sedalia, Mo.; R. M. Phelps, Fourth Avenue street line, Tremont, N. Y.; S. A. Davis, Boston, Lowell & Nashua, Nashua, N. H.; Charles S. Holbach, Catasauqua & Fogelsville, Catasauqua, Pa.; James T. Leighton, New Haven Car Company, New Haven; V. D. Perry, Hartford, Providence & Fishkill, Hartford, Conn.; Leander Garey, New York & Harlem, Morrisania, N. Y.; F. D. Adams, Boston & Albany, Springfield, Mass.; A. Steinbach, Philadelphia & Reading, Reading, Pa.; W. H. Dunham, Pittsburgh, Fort Wayne & Chicago, Eastern Division, Allegheny, Pa.; Henry Scriba, Pittsburgh & Connellsville, Connellsville, Pa.; Joseph Jones, New York Central, West Albany, N. Y.; Enoch Varney, Pithcaville Railroad, Charlestown, Mass.; George Boyden, New London Northern, New London, Ct.; C. H. Copeland, late of C. & F. R. Railroad, Ohio; Ambrose Ward, Pennsylvania Railroad, Altoona, Pa.; Samuel W. Myers, Pennsylvania, Harrisburg, Pa.; Robert S. Ramsey, Pennsylvania, Pittsburgh, Pa.; John F. Levan, Pennsylvania, Altoona, Pa.; W. F. Smith, Cleveland, Columbus, Cincinnati Indianapolis, Cleveland, Ohio; H. O. Wadlia, Illinois Central, Chicago; C. L. Gamble, Union Pacific, Omaha; T. G. Shaw, Louisville, Cincinnati & Lexington, Louisville, Ky.; Hugh Gray, Chicago & Northwestern, Chicago; Robert V. Coon, Troy & Boston, Troy, N. Y.; G. W. Demarest, Northern Central, York, Pa.; William Campbell, Chicago & Northwestern, Clinton, Iowa; John McVey, Little Miami and Columbus & Xenia, Pendleton, O.; D. S. Dockstader, Atlantic & Great Western, Meadville, Pa.; C. F. Scoville, Wells, French & Co., Chicago; M. W. Dickerman, Concord Railroad, Concord, N. H.; Christopher Woods, Union Line Transportation Company, Pittsburgh, Pa.; A. Langmaid, Northern New Hampshire, Concord, N. H.; James McGee, Pittsburgh, Cincinnati & St. Louis, Steubenville, O.; J. L. Hackathorn, Kentucky Central, Covington, Ky.; J. J. Kirkland, Pittsburgh, Fort Wayne & Chicago, Crestline, O.; E. Lockwood, Camden & Amboy, Bordentown, N. J.; D. Hoit, Toledo, Wabash & Western, Toledo, Ohio; R. Reniff, Chicago & Alton, Bloomington, Ill.; E. A. Olmstead, Long Island Railroad, Hunter's Point, L. I.; M. C. Andrews, New York & New Haven, New Haven, Ct.; A. Gleason, Old Colony Railroad, Boston, Mass.; H. Kirmse, Vandalia Line, Terre Haute, Ind.; P. C. Clark, W. & Philadelphia, Philadelphia, Pa.; William W. Bedient, Danbury & Norwalk, Danbury, Ct.; H. C. Whiting, Hannibal & St. Joseph, Hannibal, Mo.; W. H. Allison, Cincinnati, Hamilton & Dayton, and Dayton & Michigan, and Cincinnati, Richmond & Chicago, Cincinnati, Ohio; E. R. Brown, Lohigh Valley, Mauch Chunk, Pa.; Elias Pratt, Boston, Hartford & Erie, Boston, Mass.; B. Hitchcock, Connecticut River Railroad, Springfield, Mass.; George Hackett, Central of New Jersey, Elizabethport, N. J.; George Dunham, U. & T. Company, Philadelphia, Pa.; Samuel D. Daniels, Philadelphia & Baltimore Central, Chester, Pa.; J. H. F. Wiers, Atlantic & Great Western, Kent, O.; R. D. Cole, Atlantic & West Point, Newark, Ga.; R. Gunning, Alleghany Valley, Pittsburgh; H. A. Webster, New Jersey Southern; H. Steinbrunner, Cleveland & Pittsburgh, Cleveland; G. E. Stevens, Union Pacific, Omaha; William Davis, Empire Line; D. Rutherford, California Pacific, Vallejo, Cal.; W. B. Wilkins, Junction Car Works, Philadelphia; John C. Moore, Belvidere, Delaware and Flemington railroads; B. J. Mitchell, Grand Trunk, Portland, Me.; S. Griffith, Indianapolis, Cincinnati & Lafayette; J. W. Sauerbach, Cumberland & Pennsylvania; James T. Leighton, New Haven Car Company; John Kirby, Lake Shore & Michigan Southern, Cleveland; R. B. Moore, Indianapolis & St. Louis; C. S. Buck, St. Louis, Kansas City & Northern.

FIRST DAY.

The following committees were appointed:

SPECIAL COMMITTEES.

On Credentials—James T. Leighton, New Haven Car Company; Milton Wilder, Erie Railway; J. Ferris, Housatonic.

On Communications—F. D. Adams, Boston & Albany; R. S. Ramsey, Pennsylvania Railroad.

On Circulars—John Kirby, Lake Shore & Michigan Southern; D. Hoit, Toledo, Wabash & Western; Joseph Jones, New York Central & Hudson River.

On Finance—James McGee, Pittsburgh, Cincinnati & St. Louis; Aaron Steinbach, Philadelphia & Reading.

On Models and Drawings—H. C. Whiting, Hannibal & St. Joseph; George Hackett, Central of New Jersey; S. A. Davis, Boston, Lowell & Nashua.

To Present Officers for Ensuing Year—F. D. Adams, Boston & Albany; R. S. Ramsey, Pennsylvania; H. O. Wadlia, Illinois Central.

REPORTS.

Mr. Adams, as Chairman of the committee, reported on the dictionary of terms. The committee had not as yet finally decided upon names for different parts, for the subject had been fraught with difficulties on account of the vast numbers of different names loosely applied to different parts. Arrangements had been made, however, by means of interrogations sent to different members through circulars, and the replies elicited would enable the committee to fix upon some one—the most descriptive word. Mr. Steinbach spoke on the same question, after the committee had been for the present excused. He thought that great assistance would be given to the matter by the kindness of the RAILROAD GAZETTE and National Car-Builders, in giving the use of their columns toward a completion

of this work. Mr. Garey reported on communications received. The Committee on Ventilation was called on for a report, but was absent. Mr. Garey reported for the Committee on Oil Boxes. Mr. Kirby, in that connection, spoke of metal bearings, and recommended a composition of seven parts of copper and one of tin, as making the best boxes. Mr. W. A. Hopkins, a New York bronze foundry proprietor, spoke on the same subject, and advocated six parts of copper and two of tin for journal boxes, as less liable to heat than any other. He said that in France and England the leading roads were using that composition exclusively, and found it answered better than anything previously found. New metal only should be used, as old scraps often contain iron, and the friction increased the heat.

SAFETY AXLE.

Mr. Garey introduced a drawing of an axle for passenger coaches, which he stated was much less likely to break than the old style. The axle was without shoulders at the wheels, and Mr. Garey said that experience had shown that the shoulder increased the strain on the axle and rendered it more liable to break.

Messrs. Adams, Kirby and others confirmed Mr. Garey's statement, and proposed, by mutual agreement, to pledge themselves to use no more shoulders on the axles.

CAR REPAIRS.

Mr. Adams, spoke at some length on the subject of car repairs when done by the shops of one road on the cars belonging to another. He advocated standard castings and forms, giving many reasons going to show the waste of money due to the repairs done different from the original construction of the car, and the variety of work thus made to occur upon cars of the same company in a length of time, during which they had passed over other lines. He logically deduced from this the necessity of interchangeable standard parts.

Mr. Ramsey, of the Pennsylvania Railroad, offered the following resolution, which was unanimously adopted.

Resolved, That it is the sense of this meeting that the shoulder heretofore used upon axles for the purpose of staying wheels at a certain place, be abandoned, as it is a positive injury instead of a benefit.

TREASURER'S REPORT.

Aaron Steinbach, the Treasurer of the Association, reported for the previous year \$818.95 received and \$326.14 expended, leaving a balance in the treasury of \$492.81. The report was approved and passed upon the minutes.

DANGERS TO THROUGH FREIGHT CARS.

A discussion as to how to assess the damage done to freight cars on through lines, when such cars were off the roads to which they belonged, was then introduced by Mr. Adams. An hour or more was spent in debating the subject, but no conclusion was arrived at, and the subject was, on motion, referred to a committee of five to be appointed by the President. The committee consists of Messrs. Hackathorn, Kirby, Ramsey, Adams and Hoit.

REMARKS.

The meeting went well and patiently through their regular work and then debated several new subjects, so as to get the sense of the members present preparatory to presenting them again in a more definite and regular form.

There was not a very large attendance of members, the Master Mechanics Convention having carried many to Boston. They had also to contend against the various noises necessary to the brass bands, the shouting and the general uproar consequent upon the National Sangerfest in the excited city outside. They, however, yielded not to these temptations, which the bright sunshine outside increased, and there was but little disturbance of the philosophy of the members. There was one motion made to adjourn, which Mr. Adams opposed, "because they had come to work, and not to be disturbed by outside noises and sights." The motion was voted down.

ENTERTAINMENTS.

The assembly adjourned to 9 o'clock this morning, and after the adjournment, informally accepted an invitation to an entertainment tendered by the following firms: Missouri Car and Foundry Company, Vose, Dimmick & Co., M. U. Buck & Co., St. Louis Railway Supply Manufacturing Company, Rice, Dunn & Co., F. P. Corby & Co., Helmbacher Forge and Rolling Mills, St. Louis Car Wheel Company, New York Car Spring Company, West Virginia Oil and Oil Land Company, C. H. Filley & Co., St. Louis & Iron Mountain Railroad, Chouteau, Harrison & Vale, H. C. Van Tine & Co.

The programme arranged and submitted for their approval was as follows:

Wednesday evening—Invitation to Saengerfest.

Thursday, at one o'clock—Carriages to Shaw's Garden, thence to Fair Grounds, when banquet was to be served.

Thursday evening—Invitation to theatre.

Friday—Excursion on St. Louis & Iron Mountain Railroad, special invitation of Hon. Thomas Allen, President, and A. W. Soper, General Superintendent.

SECOND DAY.

After the introduction of a resolution thanking several railroad companies and others, the publishers and editors of the *National Car-Builders* and the RAILROAD GAZETTE, for courtesy, Mr. Adams moved that upon adjournment they adjourn to meet in New York. Some discussion ensued in regard to fixing headquarters in New York, some contending for the movable system. Mr. Garey, advocating the headquarters, explained that the annual meetings would still be movable. The question was settled for the present by a resolution to meet next year in Boston.

The President then introduced the question of Wheels and Axles, to which there was no response.

Dead Weight was then introduced by the President.

Mr. Adams thought it had already been desired by the members that some attempts should be made to solve this question. He would himself like to hear an answer to it, but doubted whether by narrow gauges or by any other means the present weights of freight cars could be reduced.

Mr. Varney thought the trial would be a failure under the present system, where the constant interchange of cars made each builder desire to have his cars stronger than those of other roads, so as better to stand the buffeting and come home safe. He thought that certainly eight tons was as little as could be used.

Mr. Adams had heard much of the success of narrow-gauge cars in carrying as much with 24-ton cars as 8-ton cars on the broad-gauge. If this is the case, perhaps we are using much extra timber. He did not believe the statement. He had studied the subject with some care, and agrees with Mr. Varney that it would be difficult to make a change.

Mr. Steinbach had examined the matter, and thought he had lightened his cars as much as possible. Agrees with the last speakers.

Mr. Davis said Western railroads have not the same difficulties as Eastern roads. He has some old-fashioned light cars which he always finds damaged when mixed up with modern cars. Will be glad to get rid of them. In answer to a question, he said that Western railroads have few cars like those built 25 years ago.

Mr. More said that while the question of dead weight may be a pertinent one, it has no such present importance to us now as the fixing of the standard axle. He moved therefore that the question of dead weight be laid over. Seconded. In answer to

a question from the President, Mr. More said he included oil boxes, etc.

The report of the Committee was accepted and adopted.

A general question now ensued as to whether the axle and oil box (and general bearing) questions should be taken up by the Committee of the Whole or given to a special committee.

Mr. Garey pointed out that the difficulty as regards the first arose from the lack of statistical information; that the Committee of the Whole would work without basis or data. He showed the great diversity of the information which had already come in regard to axles in use on different roads, all under the hands of competent men, each of whom could possibly give some good reason for his practice. He thought the question required a greater accumulation of facts and investigations than they then had on hand, before being entered into with a view to final settlement. He earnestly asked that such information should be forthcoming.

Mr. Davis agreed with Mr. Garey.

Mr. Kirby gave a description of the manner in which the Master Mechanics' Association collected information.

The President asked to hear the views of members in regard to sizes of axles, journals and oil-boxes, with the relative bearings.

Mr. Adams thought that the great fear of a committee yielding to a mere desire for an average would be a detriment. A discussion showing the views and opinions of members upon the *true and proper sizes* might remedy such an oversight.

A motion being made to refer the matter to a committee.

Mr. Leighton thought the matter was in a right shape. If it was referred certainly all would be, during the year, able to give information as regards details, after which a result could be obtained.

A member thought that preferences should be called for from members.

Mr. More thought the committee did not need statistical information. They should give the size of the axle which should best, without regard to statistical facts.

Mr. Garey said that the axle was only one item. Other matters were fully as important, more so. The committee should be able to cover all the ground, and the members had not looked into the matter sufficiently.

Mr. Holmes thought that each car-builder should make a report to the committee, giving his own ideas. The committee would then make a report during the year, giving reasons, etc., after which the Association can agree, or not, at the next annual meeting. He proposed an amendment, that the committee's report be printed, at least three months before the next annual meeting, in the RAILROAD GAZETTE and the *National Car-Builders*. The amendment was adopted, and the motion as amended passed.

A report of the Committee on Rules for the Use of Cars Belonging to Other Lines was presented by Mr. Hackathorn, with remarks.

Then followed a discussion as regards the value returnable for cars damaged on one road and belonging to another.

On motion of Mr. Adams, the Secretary was instructed to send to each Superintendent in the United States the rules adopted by the Association for the exchange of cars for their approval. After being so amended as to require the rules to be sent through the master car-builders of the several roads, the motion was carried.

Resolutions of condolence on the death of Mr. William Waddington, a member recently deceased, were then read by Mr. Adams of the Committee on Communications.

A letter was read from Hon. Thomas Allen, President of the Iron Mountain Railroad Company, inviting members to make a trip over that road on Friday.

The time for meeting with the Committee of Arrangements on behalf of St. Louis having nearly arrived, other communications were ordered to be printed in the RAILROAD GAZETTE and *National Car-Builders*.

Mr. Garey introduced a drawing of his own design, representing a car body and platform, which he explained, asking advice, etc.

The Secretary read the interrogatories to be used by the several committees.

The time for the annual election having arrived, the old officers were elected by acclamation. These are: President, M. C. Andrews, New York & New Haven Railroad, New Haven, Conn.; Vice-President, M. C. Ford, Little Miami Railroad; Secretary, Leander Garey, New York & Harlem Railroad, Morrisania, N. Y.; Treasurer, Aaron Steinbach, Philadelphia & Reading Railroad, Reading, Pa.

Under a resolution previously passed, admitting as associate members a certain number of scientific men, civil and mechanical engineers and others, Mr. M. N. Forney, of the RAILROAD GAZETTE, was chosen a member.

It was resolved to offer a prize of \$100 for the best drawing to be made and exhibited by a member at the next meeting.

Shortly after the Convention adjourned.

Thursday afternoon the members went to Shaw's Garden, one of the notable sights of St. Louis, and to other noted places in and around that city, under the care of a committee of citizens. Friday they took a trip on the Iron Mountain Railroad to Iron Mountain, Pilot Knob, etc. The Goodale Brake was applied to the train which carried them, and a collision strengthened them for their return.

THE SCRAP HEAP.

Ross & Arthur's Wrought-Iron Draw-Bar.

The engraving shows a draw-bar head invented by two mechanics of the Chicago & Northwestern Railway Company. The jaw is made of a heavy flattened wrought



iron ring, overlapped and welded to the draught iron. This form gives a large, solid bearing surface for a bumper head and a broad mouth so that the link is not cramped, and the weight of one car does not ride on the other. The pin is also protected and supported in the head by a greater bearing surface than the common draw bar admits of. The Chicago & Northwestern Company, after two years' trial, has over 3,500 of them in use, and is placing them on all its passenger and freight cars as fast as required. In substituting this head for one of the old pattern, the old draw-bar can be used, if not too badly broken. The patentees are Messrs. Ross & Arthur, Freeport, Ill.

The "Janus" at Work.

The Fairlie engine "Janus," built by Wm. Mason, is now employed in the coal traffic on the 140-foot grade near Weatherley, on the Hazleton Division of the Lehigh Valley Railroad.



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W. H. BOARDMAN, Acting Publisher.

CONTENTS.

ILLUSTRATIONS:	Page.	GENERAL RAILROAD NEWS:	Page.
Early American Locomotives...	259	Personal	266
Wrought-Iron Draw-Bar...	263	Traffic and Earnings.....	266
Uniform Time.....	265	Old and New Roads.....	266
MISCELLANEOUS:		Cincinnati, Hamilton & Dayton Report.....	266
M. W. Baldwin and Early American Locomotives...	259	CHICAGO RAILROAD NEWS.....	266
How the State may Affect the Management of Railroads.....	260	EDITORIALS:	
GENERAL RAILROAD NEWS:		The Master Mechanics' Convention.....	264
American Railway Master Mechanics' Convention.....	261	Uniform Railroad Time.....	264
The Master Car-Builders' Convention.....	263	Mr. Quettill on the Narrow Gauge.....	265
'The Scrap Heap'.....	263	Railroad Earnings.....	265
Elections and Appointments 266		Some Observations on the Master Mechanics' Convention.....	265

Editorial Announcements.

Address.—The RAILROAD GAZETTE will be printed for the present in New York; our printing house in Chicago having been destroyed. All communications, therefore, whether editorial or business, should be directed to the New York office. The proprietor will receive subscriptions and advertisements at his office in Chicago, Nos. 63 and 65 South Canal street, but letters should be addressed to New York.

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE MASTER MECHANICS' CONVENTION.

To describe the ball after the guests are gone, the music hushed and the wine dissipated, is proverbially a dull task. Very much like it is the annual duty which falls to our lot in commenting upon the doings and sayings which transpire at the meetings of those who assemble at the annual deliberations of the master mechanics.

As all our readers know, the place selected last year for holding the next meeting was Boston. As the previous convention was held in a southwesterly city—Louisville—it was thought best to select a northeasterly place next. That the selection was a good one, all who were present can bear testimony. Not only was the attendance quite equal to that of previous years, but what might be called the objective influences, to which the Association is to a considerable extent dependent for the interest which attaches to its annual convention, aided instead of detracting from the deliberations.

The value of these meetings, or at least that by which they will be estimated, consists in the reports and discussions themselves. As all know who have attended them, there are other advantages which are merely incidental, but are notwithstanding of little less, if not of more, value to those who attend them than the information which is imparted, or rather exchanged, in the public meetings. If the informal discussions which take place in the social intercourse at such times could be published, it would make a volume many times larger in size than the annual report, and, probably, containing a larger amount of valuable matter.

Few people know better than editors the stimulating effect which social intercourse has upon those who have knotty problems to solve. The advantage consists not so much in the value of the information which is actually imparted as in the tonic effect upon the minds of those who are working in the same field. Every person who has ever sought knowledge with any considerable degree of earnestness has experienced the mental illumination which comes from traveling, either literally or metaphorically. Those things which we look at very patiently, and, may be wistfully, from one point only, in all probability may appear very different if viewed from another

locality; and the man who wrestles with difficulties in Maine, may gain quite a different kind of knowledge from that which an experience in Texas would have given. Master mechanics are generally men whose knowledge has been acquired by personal observation to a much greater extent than from the written testimony of others.

Their information is therefore very apt to be of a kind which can be practically applicable to the questions with which they are in the habit of dealing, but which makes but little progress when new problems are presented. Quite a striking illustration of this occurred during the session of the late convention. In the report and discussion on the subject of boiler incrustation it was assumed as a matter of course, that if distilled water could be produced cheaply, it would solve the difficulty, at least so far as locomotives are concerned. We think we are quite correct in saying that nearly all the members were very much astonished at the statement made by Mr. Sellers that perfectly pure water was found to be very injurious to boilers, and that in sea-going vessels where surface condensers are used, cases have occurred in which boilers have been almost entirely ruined in one voyage by the use of distilled water. Few master mechanics had encountered this fact, and consequently they were ignorant in regard to it. Other cases of a similar character might be mentioned.

It is utterly impossible for any one man, from his own observation and experience, to take in so wide a field or learn so much that is useful as is possible if he collects the experience of others. Very good fish may be caught with a single hook and line, but many more will be gathered in if a net is skillfully spread, so that all that swim may be inclosed in its meshes.

In this connection we want at the same time to call the attention of those who still hold aloof from the Association, on the ground that the meetings are merely occasions and pretenses for social enjoyment and held only for the purpose of having a good time, to the amount of business transacted during the last session. The meetings were called to order at 9 a. m. and continued in session until 2 p. m., or five hours each day. The third day it was found that it would be impossible to finish without an extra session, so the Association adjourned from 2 o'clock to 8 p. m. and continued its meeting until nearly 11, so that during the three days the meetings occupied nearly eighteen hours. During this time hardly a moment was lost in idle discussion or "fill-bustering" of any kind. The papers were nearly all very concise, and the discussions were as pointed as it was possible for them to be. They all related to questions of practical value to railroad companies, and any solution of the questions propounded by the committees would in nearly all cases result in actual economy and money value to the railroad companies to whom it was contributed. Any railroad manager, therefore, who refuses to give his consent to the master-mechanic of his road to attend and contribute to the Association is, to say the least, either very short-sighted or blind to the interests of those whom he represents. That there is much social enjoyment in attending these meetings there can be no doubt, but we have thus far been quite unable to see why any culpability should attach to the fact that a master-mechanic and his wife have a brief holiday once a year.

Of the general character of the session of this year, we heard but one opinion expressed, and that was that altogether it is the best that has thus far been held. The reports were evidently prepared with greater care, and the discussions were more interesting than at any previous meeting. The admission of associate members introduced quite a new element into the deliberations, and if only those whose knowledge will be valuable are admitted, and allowed to participate, the effect doubtless will be good. The members cannot, however, be too careful in admitting such associates. The test should be whether the person proposed has a sufficient amount of knowledge to contribute to the Association, to justify him in occupying the time and attention of its members. It would be a very great misfortune if a number of blatherskites, without knowledge or discretion, should be admitted.

It gives us pleasure to be able to record that those elements from which the best friends of the Association felt most apprehensive had very sensibly lost ground. In the history of the Association it has been as of old; the money changers desecrated the temple, and it required a whip made up of the small cords of individual opinion to drive them out. With but one exception, those who attended the convention for the purpose of meeting the members were observant of the disapprobation with which their heretofore too convivial entertainments were regarded; and it is probable that hereafter such receptions will cause no further apprehension. We trust that what we have said will not be interpreted as an intimation that those who have business intercourse or new ideas or inventions to present in any way detract from

the usefulness of the convention. Upon the contrary, we believe that the more people who have valuable goods or ideas to exchange can be induced to be in attendance the better. It is to the indiscriminate use of motives which can be made effective only by the use of a cork-screw, to which we in common with many members of the Association object.

It was suggested in Boston by one of the members of the Association who has had an opportunity of participating in the annual "conversazione" or soiree of the English Society of Mechanical Engineers, that a similar reunion might be adopted by the master mechanics very much to the advantage, profit and pleasure of the meetings. It might to a very great extent supplant that other practice which is so much condemned and which is liable to work so much injury to the Association. We refer to the occupation of private parlors by those who wish to entertain their friends and customers. An annual soiree might turn what now is fraught with much evil into positive advantage and profit, and also encourage the other practice, growing each year more common, that of the attendance of ladies with their husbands, brothers, fathers or friends, which we are glad to say is each year becoming more general. We are promised an account of the manner in which similar meetings are conducted in England, and will refer to the subject again.

It is not our purpose in what we are now writing to give even a synopsis of the transactions of the convention. An abstract of a part of the proceedings will be found on another page, and in future numbers we will publish in full all the reports which were read and the discussions thereon.

In the session of this year it was apparent that the Association is getting into better drill. Most of the committees have obviously given more time and ability to their reports than ever before. The first one, on "Boiler Construction," and that on "Incrustation," and also the paper on the latter subject by Mr. Towne, are probably the ablest and most valuable reports that have thus far been read before the Association. The paper on the "Slide Lathe," by Mr. Coleman Sellers, is also a contribution of much value, and on a subject which most of us are apt to think we understand so perfectly that there is no occasion to study it.

The writer is probably the only person who attended both the convention of the Civil Engineers and that of the Master Mechanics. It is of course difficult not to make comparisons, which proverbially are odious. We will, however, venture on this ground so far as to say, that in the use of words and in their power of deduction the civil engineers showed the advantage which early education gives; but in handling facts, and in power of observation and capacity for transacting business, the master mechanics showed to very great advantage over their brethren.

The reception by the Bostonians was of the most hospitable kind. The arrangements were all made with the most admirable perfection, and the machinery by which it was all done had the merit of nearly all good machinery—that of being noiseless. The members were transported to and fro, were housed and fed with such generous hospitality, that we are convinced that all who were in attendance went away practicing a little private "jubilee," with which each and every one of them, when they get home, will celebrate the very hearty manifestation which the fellows of the Hub gave to their guests of the feeling of peace and good-will which they bear to all the world, as it was represented by the master mechanics.

UNIFORM RAILROAD TIME.

In the first number of the present series of the RAILROAD GAZETTE, (April 2, 1870) in an article entitled "Time for the Continent," we advocated the adoption of a standard time for all the railroads of the Continent. We tried to show that scarcely any objection to such a standard would apply which does not belong to the present practice, and that, indeed, nothing in the nature of things makes it impossible to adopt a uniform time for the ordinary business of life, as well as for running railroad trains.

The world over, British vessels sail by Greenwich time, and the National Observatory furnishes a standard for American shipping (what there is of it). It is true that in navigation some such standard is necessary to an easy calculation of position on the high seas; but, on the other hand, the relation of trains to each other is very much closer and constant than that of vessels. Indeed, we may almost say that the time-table of each railroad in the country must or should have some reference to that of every other, as it has connections which extend more or less intimately to every other.

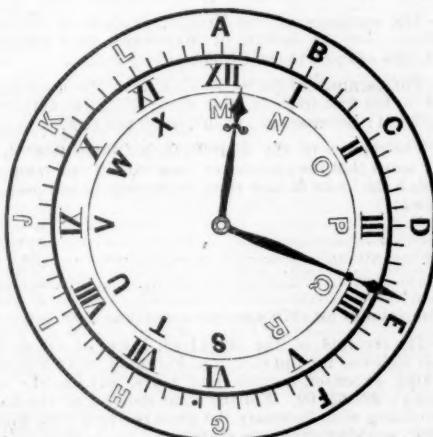
The new Western & Southern Railway Association has recognized the desirability of establishing a uniform time, and one of its committees is to report on the subject at the next quarterly meeting.

Shortly after the publication of the article entitled "Time for the Continent," a correspondent sent us a letter, in which he described some of the perplexities to which travelers are exposed under the present practice. This exposition seems to us very striking, and as the renewed discussion of the subject gives a new interest to it, we copy a part of it:

The writer remembers seeing in the railroad depot at Toledo, Ohio, three clocks, marked, respectively, Cleveland, Toledo and Chicago time, and each of course indicating a different hour. The difference between them I do not now remember, but, if these clocks had tongues as well as faces and hands, no doubt they could tell some odd stories of perplexities and mistakes, caused by their disagreement. The fact that in cases of doubt there is usually but one true solution or answer, and from one to a thousand or more equal chances of error, will, without the doctrine of the depravity of human nature, always account for the liability of mankind to make mistakes.

Now to see how perplexing a three-fold time must be let us in the case of these three clocks analyze the mental process by which a perplexed traveler must gather the necessary information to direct him when, where and how to go from Toledo. In the first place, he must know to what place he intends going—an element in the inquiry by no means always absolutely determined—second, which route must be taken; third, which train will take him to his destination; fourth, when will it leave; fifth, "what time does the road run on;" sixth, which clock indicates the time; seventh, what time by the right clock is it when the inquiry is being made; eighth, where is the train; ninth, which is the car for him to take. Consider, too, that the inquiry is usually made in a state of mind, not by any means as calm as that in which you, reader, are looking over these lines, but in a greater or less state of excitement caused by the arrival or departure of trains and passengers, the ringing of engine bells and the sounding of gongs—causes which are often very exciting or confusing to persons who are either timid or unaccustomed to travel, or both. * * * Of course I do not mean to say that all the perplexities of our confused traveler would be arranged and answered by an absolute standard of time, but I do say if there were but one, his perplexity would be much less than at present.

At the same time this correspondent proposed that the uniform time, if established, should be so designated as to be distinguished from local time, both in writing and speaking. To this end he would have the hours by railroad time designated by the letters of the alphabet, and, moreover, numbered continuously from one to twenty-four, so that there would be no danger of mistaking the hour named for one twelve hours later or earlier on the same day.



This is shown very clearly in the accompanying cut of a clock-face showing both national and local time. The letter A would indicate midnight, M noon, and X eleven at night—the last hour of the day. Then A:30 would mean half-past twelve at night, and no other time; B:30 half-past one in the morning, and so on, eliminating a source of mistake which has probably misled almost every man who travels much, at some period in his life.

The great advantage of this plan, however, would be its indicating unmistakably when railroad time is meant. Tell me that the train starts at N:45 and I cannot possibly avoid knowing that railroad time is designated. But if you say that the train will start a quarter before two in the afternoon by railroad time, I may forget whether it is afternoon or forenoon, or if I remember that, whether it is local or railroad time.

The idea of the plan—that is, names for all of the twenty-four hours, and these different from those used for local time—we believe to be very desirable in case a uniform railroad time be adopted. Whether this be the best possible design is not important.

In our engraving we have made the letters indicating the hours from 6 a. m. to 6 p. m. in outline, and the others, which designate the other half of the day, including or included in the night, black, which would help to a ready apprehension of the part of the day indicated in the locality where the clock might be placed.

Mr. Quetil and the Narrow-Gauge.

We have received from Mr. C. J. Quetil a letter in which he takes exception to some remarks in a letter by Mr. E. P. North, published in the RAILROAD GAZETTE of June 8. Mr. Quetil specially disclaims having asserted or insinuated that curves of more than 12 degrees on

roads of standard gauge are impracticable, and says he is aware that such and shorter curves are in use. He points out that the statement contained in his paper, published in *Van Nostrand's Magazine* for May, concerning the impracticability of such curves on the standard gauge is in a report made by Mr. J. P. Mersereau, of the Denver & Rio Grande Railway, which report was simply quoted by Mr. Quetil, but not indorsed, at least in this particular.

He also excepts to Mr. North's statement that the proportion of dead to paying weight is not reduced by the use of narrow-gauge cars. Mr. Quetil says the dead weight is greater on the standard-gauge car by 80 pounds, for cars of the same capacity.

Mr. Quetil takes exception to Mr. North's formula used in calculating resistances on curves, and says that the gauge should be a function of that formula, and says that a formula given by an eminent European professor for the total of sliding and flange friction combined is, for a wagon :

$R = f'(P+p) \sqrt{a^2 + b^2} \times$ in which R = resistance per wagon and per unit of weight; f' = co-efficient of friction = 0.25; $P+p$ total weight of wagon; $a = \frac{1}{2}$ the width of the track; $b = \frac{1}{2}$ of the distance between the parallel axles; r = radius of arc followed by the center of gravity of the wagon. Multiplying the formula by the length of the curve traversed by the center of gravity will, he says, give the resistance caused by sliding and flange friction on a curve. Mr. Quetil says that it is a gross error for Mr. North to say that a ton of narrow-gauge engine will pull no more than a ton of standard engine; the narrow-gauge engine will pull more, he says, because the narrow-gauge cars are lighter by 80 pounds each, and because the resistance on curves of the same degree will be less on the narrow-gauge.

Mr. Quetil's letter for the most part brings forward no new matter, being largely occupied by restatements familiar to all who have followed the general discussion of the subject in our columns for the past two years, a large part being given to the statements concerning the Festiniog Railway which are so familiar. These in any case would add nothing to the information on the subject, and therefore are undesirable; and in the present crowded condition of our columns, with reports of the various associations crowding us, we cannot possibly find room for such matter or for merely personal discussions and reflections, which occupy a large part of Mr. Quetil's paper.

Railroad Earnings.

We give below a tabular statement of the comparative earnings of twenty-three different railroad companies for the month of May and of twenty-two for the first five months of the year for 1871 and 1872. Most of these we have given separately before, under the head of "Traffic and Earnings," in our news columns. The *Commercial and Financial Chronicle* is entitled to the credit of obtaining reports for the five months for one road which has not reported heretofore (the Missouri, Kansas & Texas), and for the month from another (the Ohio & Mississippi), and also for the figures for last year from the Atlantic & Great Western and the Kansas Pacific, whose returns for 1872 we have been accustomed to publish heretofore.

The increase for the five months of \$6,400,000 is not only very large absolutely, but also comparatively, being nearly one-sixth of the receipts of 1871. It is especially remarkable that only three of the twenty roads reporting show any decrease in receipts—though not so remarkable as it would be if some companies were not in the habit of reporting earnings when they are favorable, and suppressing them when they are not. So long as there is no general custom of reporting earnings—and in this country it is the exception and not the rule—it requires considerable courage on the part of railroad officers to make reports which, reasonably or unreasonably, will give some men an opportunity to decry the management or the value of the company's property.

However, the reports cover a larger number of roads than usual, and a large number of important ones. It is noticeable that there are no reports from Eastern railroads, except from the Erie, and none from Southern roads; but that nearly all the lines named run through the territory west of Pennsylvania and New York and north of the Ohio and the 36th parallel, a territory whose exports are chiefly the products of agriculture, and which includes by far the largest part of the grain and stock-producing country of the Union.

Some of the railroads reporting have an increase of mileage in 1872. This increase is large in the case of the Central Pacific, but the earnings per mile of road nevertheless show a very large percentage of increase. The Chicago & Alton reports earnings this year, we believe, of \$99 miles of road against 511 in 1871. The Lake Shore & Michigan Southern has a small increase of mileage (but none in capital account). The Michigan Central this

year is operating the Jackson, Lansing & Saginaw road, with about 150 miles of line, in addition to the mileage worked by it last year, and we understand that its reports include the receipts on all its lines. The Milwaukee & St. Paul, the Missouri, Kansas & Texas, and the Pacific of Missouri have a considerably increased mileage, though the receipts from the additions are probably inconsiderable as yet. The Toledo, Wabash & Western is working a considerable additional mileage, but its reports, we are informed, are only for that part of its lines which it reported last year.

The percentage of increase for May is a little greater than that for the five months, being 16 $\frac{1}{4}$ per cent. for May and 15 $\frac{1}{8}$ per cent. for the five months, and, indeed, there has been very little fluctuation in the average increase of the roads reported in the different months of the year so far.

We give below a corrected table with the percentages of increase and decrease. The statements for the Pacific of Missouri, the Hannibal & St. Joseph and the Union Pacific, especially for May, are of comparatively little value, as they are in the first two cases estimated for the last week, and in the latter for the whole month:

EARNINGS IN MAY.

	1872.	1871.	Increase.	Decrease.	Pr. ct.
Atlantic & G. West.	\$435,544	\$371,375	\$64,169	....	17 $\frac{1}{4}$
Central Pacific....	1,322,775	982,341	340,434	48 $\frac{1}{2}$	
Chicago & Alton....	440,457	461,296	....	\$20,833	4 $\frac{1}{2}$
C. Col., Clin. & Ind.	378,493	277,046	101,087	....	36 $\frac{1}{2}$
Erie.....	1,739,211	1,445,373	285,839	19 $\frac{1}{2}$	
Hannibal & St. Jos.	*179,784	231,560	....	57,773	24 $\frac{1}{2}$
Illinois Central....	636,373	713,162	....	76,789	10 $\frac{1}{2}$
Ind., Bloom. & W.	125,866	77,648	47,644	....	61 $\frac{1}{2}$
Kansas Pacific....	334,225	306,944	27,341	....	9
Lake S. & Mich. So.	1,474,467	1,190,033	284,434	....	24
Marietta & Cincin.	158,718	119,650	39,068	....	33 $\frac{1}{2}$
Michigan Central....	593,641	480,847	112,794	....	23 $\frac{1}{2}$
Mil. & St. Paul....	580,458	662,368	....	81,936	12 $\frac{1}{2}$
Mo., Kan. & Texas....	150,091	81,934	68,167	....	83 $\frac{1}{2}$
Ohio & Miss....	272,510	305,965	66,345	....	20 $\frac{1}{2}$
St. L. Al. & T. H....	147,540	134,299	13,250	....	9 $\frac{1}{2}$
St. Louis & I. Mo....	187,625	17,765	69,960	....	59 $\frac{1}{2}$
St. L., Kan. C. & N'N	280,933	234,542	56,541	....	25 $\frac{1}{2}$
Tol., Peoria & War....	117,934	94,709	23,195	....	24 $\frac{1}{2}$
Tol., Wabash & W....	510,792	453,009	57,783	....	12 $\frac{1}{2}$
Pacific of Missouri....	285,000	284,733	....	19,733	7
Union Pacific....	7812,000	724,466	87,584	....	12
Western Union....	70,056	82,725	....	12,669	15 $\frac{1}{2}$
Total.....	\$11,203,731	\$9,637,917	\$1,565,815	\$269,731	
Total increase.....	....	....	....	\$1,565,804	

* Fourth week estimated.

† Estimated.

EARNINGS FROM JANUARY 1 TO MAY 31.

	1872.	1871.	Increase.	Decrease.	Pr. ct.
Atlantic & G. West	\$1,876,727	\$1,799,146	\$77,587	....	4 $\frac{1}{2}$
Central Pacific....	4,319,194	3,949,736	1,069,458	....	33 $\frac{1}{2}$
Chicago & Alton....	1,901,609	1,930,857	....	\$29,248	1 $\frac{1}{2}$
C. Col., Clin. & Ind.	1,779,141	1,425,568	353,573	....	24 $\frac{1}{2}$
Erie.....	7,322,615	5,925,449	1,397,166	....	22 $\frac{1}{2}$
Hannibal & St. Jos.	*907,744	1,130,417	....	222,693	10 $\frac{1}{2}$
Illinois Central....	2,956,670	3,051,349	95,679	....	3 $\frac{1}{2}$
Ind., Bloom. & W.	545,473	331,159	213,319	....	65
Kansas Pacific....	1,337,412	1,164,916	173,306	....	15
Lake S. & Mich. So.	7,178,820	5,878,696	1,300,154	....	25
Marietta & Cincin.	750,944	636,670	114,674	....	18
Michigan Central....	2,749,460	2,399,960	449,500	....	19 $\frac{1}{2}$
Mil. & St. Paul....	2,329,368	2,370,591	58,771	....	2 $\frac{1}{2}$
Mo. Kan. & Texas....	534,734	517,603	217,119	....	62 $\frac{1}{2}$
Pacific of Missouri....	*1,390,706	1,345,188	35,519	....	2 $\frac{1}{2}$
St. Louis & I. M. N.	878,363	640,481	237,881	....	37
St. L., Kan. C. & N.	1,349,351	1,064,769	284,489	....	26 $\frac{1}{2}$
St. L., Al. & T. H....	766,819	697,667	69,152	....	10 $\frac{1}{2}$
Tol., Peoria & War....	534,178	508,096	26,082	....	34 $\frac{1}{2}$
Tol., Wabash & W....	2,990,480	1,944,039	306,441	....	15 $\frac{1}{2}$
Union Pacific....	72,997,714	2,682,108	245,006	....	9 $\frac{1}{2}$
Western Union....	269,344	268,394	6,950	....	2 $\frac{1}{2}$
Total.....	....	\$40,507,055	\$5,747,826	\$347,290	
Total increase.....	....	....	....	\$5,400,406	

* 4th week May estimated.

† May estimated.

Some Observations on the Master Mechanics' Convention.

PHILADELPHIA, June 18, 1872.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Last week I had the pleasure of attending the fifth annual convention of the American Railway Master Mechanics' Association, which met at Boston on the 11th inst., and I cannot refrain from expressing my surprise and gratification at the masterly manner in which their deliberations were conducted.

I say *surprise*, because, while we all know that our railroad master mechanics are men of undoubted ability in their own profession, we should, however, scarcely be prepared to find that they would develop any great amount of parliamentary talent when assembled in convention. It would seem too much to expect of a body of practical men whose time is mostly given to the perfecting and operating of mechanical contrivances. And yet they did show this very talent in no common degree.

Very soon after the convention organized, it became evident even to the most prejudiced outsider that the Association was a "good thing." No one who was present could fail to be impressed with its importance and usefulness. The dignity and chairmanship of the President, the thoughtful and intelligent character of the discussions, and the perfect good temper and friendly spirit displayed by those who took part in them were beyond all praise. There was an utter absence of any personality or acrimony; every one seemed influenced only by the desire of giving and receiving the most accurate experience for the good of all.

I have been told by persons who attended previous conventions that this one was the best meeting they had seen. This is as it should be. Improvement is the object of the Association. The field over which its usefulness can extend itself seems almost boundless. If it goes on as it has begun and is now going, there seems no end to the benefit our railroad corporations and the public generally may reap from the combined experience and counsel of its members.

I found this view of the career of the Association was the one

generally adopted. Much regret was commonly expressed that the Association had not been formed many years earlier.

It was felt that many thousands of dollars might have been saved to our railroad companies, and many vexatious disappointments avoided from inadequate experiments.

Very truly yours, F. B. MILES.

Report of the Cincinnati, Hamilton & Dayton Railroad.

This company owns a railroad from Cincinnati, north by east, to Dayton, O., 60½ miles, and operates under leases the Dayton & Michigan railroad, from Dayton north by east to Toledo, 14½ miles, and the Cincinnati, Richmond & Chicago railroad, from Hamilton, O. (on its main line 25 miles north of Cincinnati), northwest 42 miles to Richmond, Ind. On its main line a third rail gives the 6-foot gauge, over which the trains of the Atlantic & Great Western reach Cincinnati. The total mileage operated is 243½ miles.

The following is a summary of the company's annual report for the fiscal year ending March 31, 1872:

Gross earnings.....	\$1,307,595 54
Transportation expenses.....	699,962 16

Leaving for interest on bonds, taxes and dividends..... \$607,633 38

The operating expenses, shown in detail, have been 53 53-100 1/2 cent. of the gross earnings.

Number of passengers carried.....	700,110
Number of tons of freight moved.....	551,936
Number of miles run by trains.....	584,216
Expenditures per mile by trains.....	\$2 22
Income per mile of road.....	1 19
Expenses.....	\$21,793 26
Expenses.....	11,666 06

During the past year, two dividends of 4 per cent. each have been paid to the stockholders. The net earnings of this company show a fraction over 11½ per cent. on the capital stock, which, with the balance of net earnings of the Dayton & Michigan Railroad of \$50,038.70, shows a net surplus of \$165,326.06, or nearly 12½ per cent.

This amount, with the other assets of the company, has been expended in permanent improvements, principally on the Dayton & Michigan and Cincinnati, Richmond & Chicago railroads, to meet the increasing demands of business, including a new grain warehouse and elevator at Toledo, new equipments, etc., which will be found fully set forth in the report of the Treasurer.

During the year 602 tons of steel, 265 tons of new iron and 509 tons of re-rolled iron rails have been laid on the track. We have now over 16 miles of steel rails in use, which have thus far proved satisfactory. We contracted last fall for the delivery of 750 tons of steel rails for the Cincinnati, Hamilton & Dayton, and 1,000 tons of iron rails for the Dayton & Michigan, to be delivered between this time and the 1st of November.

Six coal-burning locomotives have been added to our equipment during the year, four of which were altered in our shops from wood-burning ones, and two were new engines.

The lease of the land obtained from Messrs. Fosdick & L'Hommedieu, originally intended for the company's stockyards, has been transferred to the United Railroad & Stockyard Company, they assuming, after April 1, 1872, the rents, payments and conditions of the original indenture.

The Board of Directors thought it advisable to reduce the local passenger fares between Cincinnati and the intermediate points, which was done to the extent of about nineteen per cent., on the 1st of April last.

DAYTON & MICHIGAN RAILROAD.

The Board of Directors of the Dayton & Michigan Railroad on the 21st of December, 1870, to provide for the redemption of their mortgage bonds, resolved to issue an 8 per cent. preferred stock to the amount of \$3,700,000, with dividends on the same payable quarterly, to be guaranteed by the Cincinnati, Hamilton & Dayton Railroad, and at a meeting of the stockholders of the latter company resolutions were adopted duly ratifying the same.

There has been laid on the track of the Dayton & Michigan Railroad during the year 1,290 tons of new iron, and 126½ tons of re-rolled iron. The track and bridges have been kept in good repair. During the year a new passenger depot has been erected at Wapakoneta. At Toledo an elevator and grain warehouse has been constructed, and will be ready for occupancy on the 20th of May. It is estimated to hold 250,000 bushels of grain, and the cost of the building and machinery will be \$55,000, on which we have already paid \$46,258. There have been constructed at the company's shops at Lima during the past year 193 cars.

CINCINNATI, RICHMOND & CHICAGO.

The receipts of the Cincinnati, Richmond & Chicago Railroad for the past year shows a handsome increase over those of former years.

The Cincinnati, Richmond & Fort Wayne Railroad, running from Richmond to Fort Wayne, a distance of 92 miles, was delivered by the contractors to the Grand Rapids & Indiana Railroad Company, lessees of the same, under certain conditions to which our company is a party. This line, when entirely completed, must necessarily prove a valuable feeder to our line between Cincinnati & Richmond. There has been laid during the year, on the Cincinnati & Richmond Railroad, 612½ tons of re-rolled iron. In conclusion, the board express their satisfaction with the manner in which the business intrusted to the officers and employees of the several companies has been performed.

PERSONAL.

Gardner P. Drury, who was of the old firm of Hinkley & Drury, locomotive builders, of Boston, died June 11, at the age of 69.

Solomon P. Conner, Secretary of the Hartford & New Haven Railroad Company, died at Hartford on the 11th of June. He had been connected with the company about ten years.

We regret to learn that Mr. F. R. Firth, Superintendent and Chief Engineer of the Atchison & Nebraska Railroad, was seriously injured by an accident on his road on the 8th inst. He was riding on the cow-catcher of a locomotive with his secretary, Mr. Allen (a member of the class of '72 of Harvard College), when a bridge gave way, and Mr. Allen was instantly killed. Mr. Firth was partially buried in the mud and water, and held fast in the wreck for six hours. It became necessary to amputate one of his arms, and his condition was for some time dangerous. Mr. Firth was a very active and energetic man, who has exerted himself greatly to cultivate the traffic of the new road in his charge as well as in its construction. He is the son of Abraham Firth, of Boston, Assistant Superintendent of the Boston & Albany road.

General Railroad News.

CHICAGO RAILROAD NEWS.

Chicago, Burlington & Quincy.

A somewhat noteworthy thing occurred on this road last week, in regard to speed. The Superintendent of the Atchison & Nebraska Railroad at Atchison was severely injured on the 9th inst. by an accident, and telegraphed to his father, who lived in Boston, to come immediately. The father started from Boston, taking a special car on the New York Central, Great Western, Michigan Central and Chicago, Burlington & Quincy roads, and arrived in Atchison in just sixty hours from the time he started from Boston. The average time made on the Chicago, Burlington & Quincy road was 48 miles an hour for the entire distance. Between Mendota and Kewanee the time made was 48 miles per hour.

Personal.

Mr. W. C. Cleland, Assistant General and Passenger Agent of the Pittsburgh, Fort Wayne & Chicago Railway, has gone to the Hot Springs of Arkansas to spend several weeks.

Chicago & Northwestern.

This company, during the month of May, transported on its cars, chiefly from Elgin and the Fox River valley, 438,000 gallons of milk to this city.

This road, with the other grain roads entering this city, has been greatly troubled for several days to know where to put the oats that have been sent in its cars. At one time it is said the company had 900 cars on the track, all of which were loaded with oats, and no place to store them. This state of things has arisen from a "corner" on oats, concocted by some members of the Board of Trade.

Chicago, Danville & Vincennes.

This company commenced laying track on its Fountain County Branch this week.

A New Railroad Entrance.

The Railroad Committee of the Common Council have agreed upon a report for the admission of the Chicago & Canada Southern, the Chicago & Illinois River and the Chicago, Decatur & St. Louis roads into the city. They will enter the city from the south, passing along the east side of the Chicago, Rock Island & Pacific track to Sixteenth street, thence on ground purchased or to be purchased by the companies interested, as far as to Van Buren street. The Railroad Committee, at whose head is Mr. C. L. Woodman, deserves especial commendation for the manner in which it has managed this important subject.

Pittsburgh, Fort Wayne & Chicago.

A large number of musical people are availing themselves of the low rate of fare offered by this road to Boston and return during the present Jubilee.

ELECTIONS AND APPOINTMENTS.

The annual meeting of the stockholders of the Muscatine, Tipton, Anamosa & Minnesota Railroad Company was held at Tipton, Iowa, June 13. The following board of directors was elected for the ensuing year: Jacob Butler, S. G. Stien, S. M. Whicher, A. Smalley, and Z. H. Washburne, of Muscatine; J. H. Rothrock, W. P. Wolf and H. C. Platt, of Tipton; J. S. Stacey, of Anamosa. The board of directors then re-elected the old officers as follows: S. G. Stien, President; H. C. Piat, Vice-President; W. H. Alden, Secretary; J. Culbertson, Treasurer; and Jacob Butler, S. G. Stien and W. P. Wolf, Executive Committee.

The stockholders of the consolidated Flint & Pere Marquette Railroad Company have chosen the following board of directors: Eber B. Ward, Detroit; Samuel Farwell, Utica; Jas. K. Hitchcock, Orange County, N. Y.; W. H. Prentiss, Chicago; Jesse Hoyt, New York; W. W. Crapo, New Bedford, Mass.; H. C. Poiter, G. W. Leslie, W. L. Webber, East Saginaw, Mich. The following officers have been elected: President, E. P. Ward; Vice-President, Samuel Farwell; Secretary and Treasurer, H. C. Potter; Superintendent, Geo. C. Kimball; Auditor and General Ticket Agent, Gilbert W. Leslie; Assistant Treasurer, L. C. Storrs; Solicitor and Land Commissioner, W. L. Webber; Executive Committee, E. B. Ward, Samuel Farwell, W. W. Crapo, H. C. Potter. These gentlemen all held the same positions in the old company.

At a meeting of the directors of the proposed Zanesville, Cumberland & Caldwell Railroad Company at Zanesville, O., recently, the following directors were present: Samuel Thomas, Daniel Applegate, Joseph Black, William Hall, William Stranahan and R. Chambers. Gen. Samuel Thomas was elected President of the company, Captain William Hall Vice President, and Peter Black Treasurer. D. B. Linn was appointed Attorney and Secretary.

The following directors of the Broadway & Seventh Avenue Railroad Company have been elected for the ensuing year: James W. Foshay, Thomas B. Kerr, Thurlow Weed, George Law, Augustus F. Smith, Jesse A. Marshall, Charles Johnson, Hugh Smith, John Anderson, Peter B. Sweeney, Francis A. Palmer, John J. Bradley, Jacob Sharp.

Mr. O. C. Green, Superintendent of Telegraph and Train Dispatcher of the Lake Superior & Mississippi Railroad, has resigned on account of ill health, and Mr. F. E. Merrill has been appointed in his place. A handsome present was made to Mr. Green on his retirement by his fellow-officers and the operators in the general office.

At the annual meeting of the stockholders of the Mississippi Valley & Western Railway Company, held in Canton, Mo., June 3, the following directors and officers were chosen directors: E. Pratt Buell, Warsaw, Ill.;

John Tillson, Quincy, Ill.; H. Davis, Canton, Mo.; Wm. Irvin, Henry County, Ill.; George H. Simpson, La Grange, Mo.; N. Rollins, Canton, Mo.; George Edmunds, Jr., Hancock County, Ill.; George M. Ocheltree, Waterloo, Mo.; J. A. Hay, La Grange, Mo. Officers—John Tillson, President; H. Davis, Vice-President; Henry Root, Treasurer and Financial Agent; E. Pratt Buell, General Superintendent and Chief Engineer; W. F. Rector, Assistant Superintendent; J. W. Whipple, Assistant Engineer; N. Rollins, Secretary and Attorney; Charles H. Spencer, General Freight and Ticket Agent.

At the annual election for officers of the Missouri Railway Construction Company, the corporation which has the contract for constructing the Mississippi Valley & Western Railway, at the office of the company in Canton, Mo., May 20, the following officers were elected for the ensuing year: E. Pratt Buell, President and General Manager; Wm. Irvin, Vice-President; H. Davis, Treasurer; N. Rollins, Secretary; George Edmunds, Jr., Attorney and Financial Agent; W. F. Rector, Assistant Superintendent.

At a meeting of the stockholders of the Plymouth, Kankakee & Pacific Railway Company, June 12, the following were duly elected directors for the ensuing year: Wm. Eddy, Hennepin, Ill.; Joel W. Hopkins, Granville, Ill.; John C. Campbell, Highland Park, Ill.; J. G. Strong, Dwight, Ill.; A. Buck, Pilot, Ill.; John Dale, Kankakee, Ill.; Samuel T. Hanna, Fort Wayne, Ind.; John C. Cushman and A. C. Capron, Plymouth, Ind. Subsequently the board organized and elected Samuel T. Hanna, President; Joel W. Hopkins, Vice-President; John C. Cushman, Secretary; J. G. Strong, Treasurer; A. C. Capron, General Attorney; and T. J. Nicholl, of Hennepin, Ill., Chief Engineer.

TRAFFIC AND EARNINGS.

The receipts of the St. Louis, Kansas City & Northern Railway for the second week of June were: 1872, \$69,170; 1871, \$52,870; increase \$16,300, or 31 per cent.

The estimated earnings of the Kansas Pacific Railway for the first week of June were: freight, \$46,930.90; passengers, \$30,579.90; total, \$77,510.80. Of this \$1,047.00 was for government freight, \$219.95 for carrying United States troops, and \$1,400 for carrying mails.

The earnings of the Lake Shore & Michigan Southern Railway for the first week in June were: 1872, \$313,580; 1871, \$247,822; increase, \$65,758, or 26½ per cent.

The earnings of the Toledo, Wabash & Western Railway, for the month of May were: 1872, \$95,612; 1871, \$84,243; increase, \$1,369, or 1½ per cent.

The earnings of the St. Louis & Iron Mountain Railroad for the first week in June were: 1872, \$48,411; 1871, \$30,290.41; increase, \$18,120.59, or 60 per cent.

The reports of the Monongahela Navigation Company show that the amount of coal mined and shipped through the locks of the river improvement has been as follows:

	Bushels.
1851	12,500,000
1867	30,072,700
1868	45,301,000
1869	52,512,000
1870	57,596,400

The amount for 1870 was thus more than 2,000,000 tons.

The receipts of the Rockford, Rock Island & St. Louis Railroad for the month of February were \$92,667; working expenses, rentals and taxes, \$71,035.91; net earnings, \$21,631.09. For the eight months of the fiscal year ending with February the gross receipts were \$750,188.89; working expenses, rentals and taxes, \$519,282.31; net earnings, \$230,906.58. The interest on the mortgage bonds which accrued during the same period was \$420,000.

The receipts of the Lake Shore & Michigan Southern Railway for the first week of June were: 1872, \$313,580; 1871, \$247,822; increase, \$65,758, or 26½ per cent.

MISCELLANEOUS.

The new express from Paris to Rome began running June 1. It consists of four first-class cars, travels 40 miles per hour, and completes the distance in 34 hours, starting from Paris at 8 a. m. and arriving at Rome at 6 p. m. of the following day.

The Schoharie Republican says: "One hundred and twenty-five thousand tons of bituminous coal will pass over the Susquehanna Railroad to Albany this year. Nearly the entire amount goes on to Troy."

OLD AND NEW ROADS.

Continental Railway.

Articles of consolidation between the consolidated New York Western Railway Company, a corporation organized and empowered to build a road through the States of Iowa, Illinois, Indiana and Ohio, and the Continental Railway Company of Pennsylvania, were filed with the Secretary of State at Indianapolis, June 15. The consolidated company is to be known as the Continental Railway Company. Its affairs are to be managed by a board of eight directors, two of whom may reside in Iowa, two in Illinois, one in Indiana, two in Ohio, two in Pennsylvania and the residue at such places as may be determined upon by the stockholders. The headquarters of the company are to be located in New York, but the consolidated companies are to maintain their local organizations with an office in each one of the States, whose President shall be a Vice-President of the general company. These local organizations are to carry out the contracts for building made with the Central Railway Construction Company. It is made lawful for the company to establish an advisory board in

Europe, with a general office in London, under the name of the "London Board of the Continental Railway," this board to have the right to have an agent in America. The capital stock is fixed at \$100,000,000, divided into 1,000,000 shares, and right is granted to issue bonds and borrow money to build and equip the road. The road which this company intends to build is "a grand trunk road from Council Bluffs to New York city, with connecting branches and lateral lines to other cities in the United States, its territories, or elsewhere." The officers of the road are as follows: President, Edward Dodge; Vice-President, James E. Abbott; Local Vice-Presidents, Hon. F. W. Hughes, Pennsylvania; Hon. W. P. Noble, Ohio; Hon. R. S. Dwiggins, Indiana; Hon. E. V. Bronson, Illinois; Hon. George Greene, Iowa; Treasurer, Silas M. Hibbard; Secretary, James M. Coleman, Directors, to serve until June 1, 1875: Abraham B. Colman, New York; Silas M. Hibbard and James M. Coleman, Brooklyn; Hon. F. W. Hughes, Pennsylvania; Hon. George Greene, Iowa; James E. Abbott, Rock Island, Illinois. To serve until June, 1874: Alvin Burt, New York; Edward Dodge and Hon. E. Hall Brooklyn; Hon. E. V. Bronson, Kewanee, Illinois; Hon. R. S. Dwiggins, Rensselaer, Indiana; Hon. W. P. Noble, Tiffin, Ohio. To serve until June, 1873: Henry E. Dodge and Miles B. Dodge, Brooklyn; William Bigler, Pennsylvania; Hon. C. Foster, Ohio, Colonel William H. Merritt, Iowa; Hon. P. W. Shaefer, Pottsville, Pennsylvania.

Alabama & Chattanooga.

In the United States District Court at Montgomery, Ala., June 15, Judge Busteed confirmed the sale of this road and ordered the assignees in bankruptcy to deliver the road to the State authorities.

Memphis, El Paso & Pacific.

The Sherman (Texas) *Land Journal* says: "The greater portion of the Memphis & El Paso Railroad was sold at Paris, June 5, Messrs. Brace and Ben. Epperson being the purchasers, Mr. Brace representing the French parties who had a mortgage on the road, and is also supposed to represent Tom Scott. The sale included the lands, stocks, iron and all the archives of the road, and brought \$88,000, a small portion of the road remaining unsold, as the sale was forbidden by Clay Hynson, of Jefferson. This will also be sold in July—the marshal desiring to wait for further developments."

Pittsburgh, Fort Wayne & Chicago.

The Columbus (Ohio) *State Journal* of June 17 says: "The arguments in the case of the Attorney-General against the Pittsburgh, Fort Wayne & Chicago Railway Company have been concluded in the Supreme Court, Attorney-General Pond representing the State and Judge Ranney and J. Twing Brooks appearing for the company, and the case is now in the hands of the judges. This case grows out of an act of the Legislature ordering proceedings in the nature of *quo warranto*, to ascertain by what right the railroad company operates in Ohio. The claim on the part of the State is that the company have not a sufficient charter."

"In 1863 the Legislature of Ohio authorized the old consolidated Pittsburgh, Fort Wayne & Chicago Railroad Company to make a deed of their franchises and privileges to the new Pittsburgh, Fort Wayne & Chicago Railway Company; the company claim this carries the full force of a charter. Should this fail, they fall back on the act of 1856, authorizing a consolidation of the three railroads which now constitute the Pittsburgh, Fort Wayne & Chicago; and as a third resort they set up that they are a foreign company chartered by the State of Pennsylvania, and operating in Ohio by permission of this State."

Muscatine Western.

A dispatch from Davenport states that this company has laid six miles of its track and put down a switch connecting with the Chicago, Rock Island & Pacific road, at Muscatine.

Hamilton Branch.

A certificate of incorporation was filed in the office of the Secretary of State at Columbus, Ohio, June 15, for the Hamilton Branch of the Cincinnati & Terre Haute Railway. The road to be constructed will run from a point on the western boundary of the State of Ohio, at or near the town of Harrison, and connecting there with the Cincinnati & Terre Haute Railway, and thence through the counties of Hamilton and Butler to the city of Hamilton and Butler county, Ohio, and thence through the counties of Butler, Warren and Hamilton to Loveland, Clermont County, Ohio. The capital stock is to be \$1,500,000, and the corporators are—Job E. Owens, Fergus Anderson, Clark Lane, John M. Laus, Jacob Shaffer, N. M. McDowell, Luke T. Brien and Ezra Potter.

Louisville, New Albany & St. Louis.

Articles of consolidation of the Louisville, New Albany & St. Louis Air Line Railroad Company, and the St. Louis, Mount Carmel & New Albany Railroad Company were filed with the Secretary of State, at Indianapolis, recently. The name of the consolidated company to be the Louisville, New Albany & St. Louis, and the directors of both companies to form the board of directors of the new company, until February 24, 1873, when a new board of thirteen directors is to be chosen. The capital stock to be \$3,000,000 in shares of \$50. The board is authorized to issue thirty year bonds of the company to the amount of \$25,000 for each mile of its united line of railroad, bearing interest at the rate of 7 per cent. per annum, payable semi-annually; the bonds and interest payable in gold in the city of New York, and secured by mortgage on the entire property and franchises of the new corporation. The contract of the St. Louis, Mount Carmel & New Albany Railroad Company, with Lewis, Chamberlain & Mathers, with their consent, is modified and changed as follows, viz.: Of the \$650,000 of capital stock which said Lewis, Chamberlain & Mathers are to receive in part payment for the construction of said company's line of railroad, \$450,000 shall be transferred by said contractors to the new corporation, to be held, sold or disposed of by the board of

directors for its benefit. And in lieu of said stock so transferred, and in full payment therefor, the said contractors shall have issued to them the promissory note of said new corporation for the sum of \$130,000; said note shall not bear interest for the first two years after its date, but shall have the same force and effect in law against the corporation as a second mortgage bond would have, and shall be payable in ten years from date. All orders or resolutions heretofore made by the directors of said companies respectively in relation to the location of the principal machine shops, and all contracts made and entered into, and all acts legally performed by either of said corporations are accepted and ratified, and are to be carried out in good faith by the consolidated company.

Portland Railroad.

The Springfield Republican says that the extension of the Athol & Enfield Railroad to Springfield has given new life to this projected Connecticut railroad, as the Portland road and the Athol & Enfield can enter the city on the same track, thus making a large saving of land damages, the amount of which has hitherto been the chief obstacle to the construction of the road. The Connecticut people now offer to build this road to the State line, provided Springfield will meet them there. It is said that \$400,000 voted by the city some time ago, for the Springfield & Stafford road, can be used for the Portland road.

California & Oregon.

This road has been completed to Cottonwood, 25 miles beyond Red Bluff. Regular trains will not begin to run until the track is laid to Shasta, 55 miles from Red Bluff.

Houston & Texas Central.

The strike of the employees of this road still continues, though a few of the men have gone to work and some have taken positions on other roads. Regular passenger trains are running, but freight trains are almost entirely stopped. Seven locomotives are reported disabled at Hempstead.

Painesville & Youngstown.

A Painesville correspondent of the Cleveland Herald says that Messrs. Ford & Meyer have sold a large interest in this road to a company composed of prominent citizens of Youngstown and some gentlemen from other places. It is expected to have the cars running to Char- don in a few days and that the road will be pushed forward to completion at once.

St. Joseph & Denver City.

It is reported that the parties at work on the grading are now within a few miles of the junction with the Union Pacific, and that the track is being laid at the rate of a mile a day.

Boston, Concord & Montreal.

It appears from the last annual report of this company, that the gross earnings of the road for the fiscal year, ending March 31, 1872, were \$634,895. The operating expenses were \$500,643, making the net earnings \$134,252. This includes the earnings of the Littleton & Lancaster Extension, as well as the White Mountains, N. H., road. Work on the extension from Lancaster to Northumberland, to connect with the Grand Trunk road, has been delayed by the severe winter, but the work is expected to be finished in time for the summer business. The completion of this road will make a connection with the Grand Trunk and the West.

Northern of New Hampshire.

The twenty-seventh annual report of this company, just issued, shows that, during the last fiscal year, the gross earnings of the road were \$722,775. The operating expenses, including State tax and new rail account, were \$535,033. Two dividends, each of \$4 per share, have been paid, and \$8,100 of bonds have been cancelled, leaving the outstanding indebtedness of the company \$102,100, payable April 1, 1874. The business of the road is picking up, and arrangements have been made with other roads which afford valuable Western connections, and which are expected to prove eventually sources of great profit to the Northern road.

Athol & Enfield.

It is reported that both the Vermont Central, and the Massachusetts Central are ready to lease the extension of this road to Springfield. The Massachusetts Central will form a junction with the Athol & Enfield road at Enfield, and it is claimed that the distance from Springfield to Boston will be eight to ten miles less by way of Enfield, than by the present route.

Worcester & East Brookfield.

Meetings have been held, and a committee appointed to have a survey made for a railroad from Worcester to some point near East Brookfield, Mass.

Duanesburgh Railroad.

The Schenectady Union says that this railroad has not been leased to the Delaware & Hudson Canal Company, and that the negotiations have been suspended.

This road, which is about completed, runs from Duanesburgh, on the Albany & Susquehanna road to Schenectady.

Gilman, Clinton & Springfield.

It is reported that the managers of this road have made arrangements to extend their line north-east to Plymouth, Ind., on the line of the Pittsburgh, Fort Wayne & Chicago.

Louisiana & Missouri River.

This road is completed to within ten miles of Jefferson City, and it is expected that through trains will be running within a week.

Dividends.

The New York & Harlem pays a dividend of 4 per cent. for the half-year, payable July 1. Books close June 20, and reopen July 2.

The Chicago & Northwestern makes a dividend of 3½ per cent. for the half-year on the preferred stock, payable June 27. Transfer books were closed on the 15th, and will be reopened on the 29th.

The Delaware & Hudson Canal Company, on July 1, will pay dividends of 3½ per cent. for the half-year on the stock of the Rensselaer & Saratoga and the Albany & Susquehanna railroad companies. Transfer books will be reopened the next day.

Wells, Fargo & Co. will pay a 3½ per cent. dividend on their stock July 5. Transfer books close June 24, and will be reopened July 5.

Great Western of Canada.

The company advertises for proposals for the construction of the last division of the new Glencoe & Fort Erie Branch, said division extending from the Welland Canal east to Fort Erie, a distance of 17 miles. The plans, profiles and specifications may be seen at the office of the Chief Engineer, George Lowe Reid, in Hamilton, Ont., and proposals may be addressed to the Treasurer, Joseph Price, at the same place, until June 25.

New Jersey Midland.

This road was formally opened Saturday, June 8, by an excursion to Elenville, and at the same time the road was formally put into the possession of the New York & Oswego Midland Company, to which the New Jersey Midland has been leased in perpetuity. The New Jersey Midland has now in operation on this end of the main line the section from near Marion Station, on the Pennsylvania road, to Liberty Falls, 124 miles; also the Crawford Branch, from Middletown to Pine Bush, 13½ miles, and the Elenville Branch, from Summitville to Elenville, 7½ miles—making in all 145½ miles. From Marion Station the trains run into Jersey City over the track of the Pennsylvania road.

We give below the stations of the New Jersey Midland:

Jersey City	0	Montclair Junction	35½
Pennsylvania Junction	2	Bloomingdale	36½
Erie Railroad Crossing	2½	West Bloomingdale	37½
New Durham	6½	Smith's Mills	39
Ridgefield Park	11	Charlottesville	48
Hackensack	13½	New Foundland	44½
West Hackensack	14½	Oak Ridge	46½
Lodi	15½	Stockholm	48
Dundee Lake	16	Snufftown	49½
Market Street	19½	Ogdensburg	50½
Paterson, Broadway	20	Franklin Furnace	51½
Riverside	21½	Sussex Junction	52½
Hawthorne	21½	Hamburg	53½
Van Ninkle's	22½	Lawrence	52½
Midland Park (Godwinville)	26	Mardin's	6½
Wortendyke	26	Dickertown	66
Wyckoff	2½	Wantage	68½
Campgaw	29½	Quarryville	70
Crystal Lake	30½	Van Sickles	71
Oakland	31½	Unionville	73½
	34½		

Of this, the section from Paterson to Smith's Mills, 10 miles, has been opened for nearly a year, and that from Paterson to Hackensack several months. From Unionville to Middleton, N. Y., the (lease) Middletown & Unionville road is used, the New Jersey Midland properly beginning at Middletown. This New Jersey Midland road, just opened, should not be confounded with the Montclair road, which is now in course of construction and to which the name of Midland is frequently applied. The Montclair, leaving the Midland near Pompton, runs through Mead's Basin, Little Falls and Belleville, crossing the Passaic just below Belleville, and will, when completed, intersect the Pennsylvania road west of the Hackensack River.

Boston & Albany.

This company is about to begin the construction of a new freight depot in Springfield, which will be 600 feet long and 50 feet wide, surrounded by a platform ten feet wide.

The Springfield Republican says:

"There is a lively local agitation at present in at least four different sections of the State for straightening the Boston & Albany Railroad, the parties who are stirring the matter being, of course, those who would be benefited by the changes proposed. One is the old plan of a new departure in Westfield, to run through Blandford to Lee, and thence on the route of the Lee & Hudson Railroad to West Stockbridge and State Line; another is a nearly straight line from Pittsfield to Albany, saving 18 miles of distance, but necessitating a tunnel a mile and a half long; still another is a similar straightening between Worcester and Brookfield, where the road makes a large departure from a direct course; while the fourth is a more northerly line east from Worcester, passing through the towns of Northboro and Marlboro. In response to local solicitation some of these lines have been surveyed, but the managers of the Boston & Albany road have no present intention of making the desired changes. The whole energies of the road are directed to furnishing facilities for the speedy carrying of its immense business. Its freighting has been much larger during the last six months than in any previous half-year in its history, and the increase of business, during the last year, exceeded the whole amount done in 1846."

Rockland Central.

The stockholders of this and of the "Rockland Central Extension" company will hold a meeting, July 1, at No. 25 Nassau street, New York, to ratify or reject an agreement for the consolidation of the two companies.

New York, West Shore & Chicago.

The work of tunneling West Point for this railroad has been begun. The tunnel will be three-fourths of a mile in length, and two years will be required for its completion.

New York & Harlem.

The new branch of this road from Golden's Bridge (44 miles from the Grand Central Depot in New York) northwest about seven miles to Lake Mahopac was opened for traffic on the 17th of June.

Railroad Bridge Over Niagara River.

A Lewiston correspondent of the Buffalo Commercial says that at a meeting of the directors of the Lewiston & Queenston Suspension Bridge Company, at Lewiston, June 12, there seemed to be an unanimous determination to build a railroad bridge in connection with the carriage and foot bridge, to accommodate the Lake Ontario Shore Railroad and any other road which may wish to cross

the river. The bridge won't be about 575 feet span and 80 feet above the river. There is some talk of building a tubular instead of a suspension bridge.

Montrose Railroad.

This road will extend from Montrose, Pa., southward 28 miles to Junkhannock, where it connects with the Pennsylvania & New York Division of the Lehigh Valley Railroad. The grading is nearly completed, and track-laying will be commenced in a few days. The gauge of the road is 3 feet, and the rails 40 lbs. per yard. The locomotives are to be of the Mogul pattern, weighing about 18 tons.

Lehigh Valley.

Through passenger cars are now run from Sunbury to Eastern Pennsylvania, over the new Danville, Hazleton & Wilkesbarre and the Lehigh Valley roads.

Maine Central.

At a recent meeting of the directors Anson P. Morrill, from the Special Committee on Permanent Location of Company's Shops, made a report signed by a majority in favor of Waterville. The report was accepted, laid on the table and will come up for final action at a future meeting. The directors decided adversely to the removal of the general offices from Augusta, not regarding it as a pressing necessity. In the board it was voted to issue a limited amount of bonds, not exceeding one million dollars, to run forty years, and paying seven per cent. interest.

Kennebec & Wiscasset.

Colonel A. W. Wildes, the engineer, has made a survey for this proposed road from King's Mills in Whitefield to the National Military Asylum at Togus. By this the distance from Augusta to King's Mills will be 13½ miles. Estimates are made for a narrow-gauge railroad.

St. Louis, Kansas City & Northern.

The new shops of this company at Moberly, Mo., are to be of the following dimensions: Mach ne shop, 220ft. x 120x20; blacksmith shop, 200ft. x 100x20; car shop, 300ft x 80x20; paint shop, 300ft. x 80x20; planing mill, 200ft. x 75x20; foundry, 200ft. x 60x20; store rooms and offices, 100ft. x 60x20; pattern shop, 40ft. x 40x20; engine house, 21 stalls. The buildings will require 2,750,000 brick, 4,000 cubic yards of stone work, 3,500 feet water table, and about 1,000 window sills. Mr. Henry Watson, of Alton, Ill., has been awarded the contract for the excavation, stone and brick work and cut-stone work of these buildings.

International Railroad.

This road is now open to Douglas, Anderson County, 85 miles northeast of Hearne.

Kansas Pacific.

June 3 and 4, thirteen herds of Texas cattle, numbering in all 35,000 head, arrived at Ellsworth, on the line of this road. These, with previous arrivals, make the number near Ellsworth about 45,000 head.

Platte & Republican River.

Articles of incorporation of this company have been filed in the Secretary's office of Nebraska. The company propose to build a railroad from Columbus, Neb., through the counties of Platte, Polk, York and Fillmore to a point on the Republican River. The capital stock is to be \$2,000,000, with privilege of increasing to \$51,000,000.

Philadelphia & Erie.

Trains commenced running on Wednesday morning, June 12, over the new bridge of the Philadelphia & Erie Railroad at Linden, west of Williamsport, which was burned the previous week. The bridge was about 1,100 feet long.

Northern Central.

The work of rebuilding the Dauphin, Pa., bridge over the Susquehanna on the Northern Central Railway, half of which was burned some time since, is nearly completed.

New York to Williamsport.

Through passenger cars are now run from Williamsport to New York via the Catawissa and Central Railroad of New Jersey, the connection being made through the recently completed Nesquehoning Tunnel, near Mauch Chunk.

The Mauch Chunk "Switch-back."

The pleasure travel over the Switch-Back Railroad at Mauch Chunk is unusually heavy this season. Most of the visitors come from Philadelphia and vicinity.

Central Pacific.

This company has now a large force of men at work improving their property in Mission Bay, San Francisco. Large warehouses and docks are to be built, the present accommodations being insufficient.

Bedford & Bridgeport.

This Pennsylvania road is now nearly all graded and the track laid at the Bedford end to within seven miles of Bridgeport, and the Cumberland end, under the management of the Cumberland & Pennsylvania line, is finished nearly to the Maryland line, a distance of about five miles from Cumberland, leaving only an intervening distance of about fifteen miles to complete the entire line of road. The Bedford *Inquirer* says that if the iron is promptly delivered the road will be finished by the end of June.

Green Bay & Lake Pepin.

The town of St. Lawrence, Waupaca County, Wis., has voted \$5,000 to this road, in addition to a previous subscription of \$10,000. The town of Scandinavia refused to vote an increase of \$5,000 to its original subscription.

Cincinnati, Wabash & Michigan.

The engineers of this road have completed the survey of the line to Marion, Ind., about 20 miles southeast of the present terminus at Wabash, on the Toledo, Wabash & Western Railway, and it is hoped that it will be finished to Marion by October.

Mineral Range & L'Anse Bay.

Preliminary surveys are now being made for the route of this road between Portage Lake and the Calumet Mine.

Oil Producers' Railroad.

A meeting of the stockholders of this company has been held at Titusville, Pa., to complete the organization of the company in order to file the necessary papers to procure the charter. The preliminary surveys are all complete, and as soon as the necessary steps have been taken, the road will be located and contracts let. The following officers were elected: President, W. B. Roberts; Directors, W. B. Benedict, Samuel Minor, S. Q. Brown, James Parshall, W. H. Abbott, E. B. Grandin, H. C. Bloss, E. A. L. Roberts, J. H. Davis, J. Dillingham, G. C. Hyde, F. W. Andrews.

Western Maryland.

On June 4, the first train over this road arrived at the outer station at Hagerstown, having made the run from Baltimore in three hours and twenty minutes. The train contained the President and directors of the road, and was met on its arrival by the Mayor, Town Council and a large number of citizens, but no pre-arranged demonstration was made.

Worcester & Somerset.

The Crisfield, Md., *Leader* says that trains commenced running May 29 on this road from King's Creek, on the Eastern Shore Railroad, to Costen's Station. Costen's is within three miles of Newtown on the Pocomoke River, which is to be the terminus of the road. Trains will run regularly to Costen's during this month, and by July 1 the road will be completed to Newtown.

Norfolk & Lynnhaven.

The Norfolk *Journal* of June 14 says that the stockholders of this company, which intends to build a road from Norfolk to a point on Lynnhaven River, held a meeting June 13, and organized by the election of the following officers: President, Wm. H. Turner; Vice-President, James S. Garrison; Treasurer and Secretary, J. F. Welborn; Directors, W. L. Oswald, E. C. Robinson, Thomas Bottimore, C. Borruss and Virginian Freeman. After the election the directors held a meeting and appointed Captain Virginian Freeman Chief Engineer and Superintendent of the road. After the meeting the company proceeded to the point where the road is to commence, where ground was broken and a rail laid. The construction of the road is to be pushed forward rapidly.

Atlantic, Mississippi & Ohio.

A survey is to be made for a branch of this road from Blacks'-and-Whites' station to Christianville, about 33 miles, passing through Nottoway, Lunenburg and Mecklenburg counties. This branch would be nearly parallel with the main line of the Richmond & Danville road, and about twelve miles from it, and at the southwestern end it would approach very nearly the line of the branch from Keysville to Clarksville, which is now being constructed by the Richmond and Danville Company.

Columbus & Lima.

The Columbus, O., *State Journal* says that the long talked of railroad from Columbus via Marysville and Beilefontaine to Lima, is about to be built, several Eastern capitalists having become interested in the road. The road is to be used chiefly as a coal road to carry the coal of Perry County, and the Hocking Valley, and will require the building of about 80 miles of new road.

Cincinnati & Springfield.

The last rail of the Short line was laid in the vicinity of West Chester, Butler county June 8. With the exception of ballasting in places between Dayton and Cincinnati, this completes the road. In a very short time through passenger and freight trains will be put upon the line.

Union Depot at Columbus, Ohio.

The Cleveland, Columbus, Cincinnati & Indianapolis and the Pittsburgh, Cincinnati & St. Louis Companies have agreed to build a Union depot at Columbus, O. The depot is to be built by a company organized for that purpose, each road having an equal share in the management. Provision is to be made for the occupancy of the depot by all roads which now enter Columbus or which may hereafter come into the depot.

Flint & Pere Marquette.

The stockholders of the Flint & Pere Marquette, the Bay City & East Saginaw, the Holly, Wayne & Monroe, the Flint River and the Cass River railroad companies have held a mass convention and voted in favor of the consolidation of the five companies into one. The new company is formed under the general laws of the State of Michigan and will be named the Flint & Pere Marquette Railroad Company. The Flint & Pere Marquette has now about 149 miles of road built, from Holly to Reed City, on the line of the Grand Rapids & Indiana road; the Bay City & East Saginaw has 18 miles, and the Holly, Wayne & Monroe, 63½ miles giving the consolidated road 225 miles of completed road. The Flint River and Cass River roads are in progress. The Holly, Wayne & Monroe and the Bay City & East Saginaw roads have been heretofore leased and operated by the Flint & Pere Marquette Company. The company has several land grants and it is intended to extend the line considerably this year.

Rhode Island & Massachusetts.

A committee of those who were engaged in forming this company decided to adopt the 3-feet gauge, but when it organized under the general railroad law of Massachusetts June 7, the standard gauge was adopted. It was voted that the road shall pass through Worcester, Millbury, Grafton, Upton, Milford, Bellington, Franklin, Wrentham and Attleboro, in Massachusetts. It was also voted that the capital stock of the company should be \$600,000, in 6,000 shares of \$100 each. The following gentlemen were chosen directors: G. T. Wilson and Isaac H. Southwick, of Providence, R. I.; Harvey Chase, of Valley Falls, R. I.; William E. Rice, R. H. Chamber-

lin and T. L. Nelson, of Worcester; George F. Slocomb, of Grafton; William Knowlton, of Upton; Samuel Walker, of Milford; William F. Draper, of Hopedale; James P. Ray, of Franklin, and H. N. Daggett, of Attleboro, Mass.

Davenport & St. Paul.

The town of High Forest has voted \$10,000 and Pleasant Grove \$15,000 to this road.

Marquette & Ontonagon.

The Ontonagon *Miner* has a report that this road has been sold to the Houghton & Ontonagon Railroad Company. The price is said to be \$3,000,000.

Wisconsin Central.

The Bayfield *Press* says that the first locomotive for the northern division of this road was expected at Ashland by June 15, and that another engine, fourteen flats and 2,000 tons of railroad iron are on the way.

Keokuk, Kansas City & Lexington.

Several towns on the line of this proposed road are about to vote on propositions to subscribe aid to it.

Farmers' & Miners' Railroad.

This is the name of a corporation which is asking municipal subscriptions to enable it to build a road from Urbana southwest to McArthur, Ohio, a distance of about 100 miles.

Canada Pacific.

The London *Times* has the following account of the Canada Pacific project, to which the British Government has agreed to contribute both land and money:

"A copy of the act for the construction of the Canadian Pacific Railway, which was read a first time in the Parliament of the Dominion on the 26th ult., has just been received. Under the agreement for the union of British Columbia with the Canadian Dominion, it was provided that within two years from the date of such union—namely, from the 20th of July, 1871—the Dominion Government should secure the commencement from the Pacific coast on the one side and the existing Canadian railway system on the other of a through line, which is to be completed by the 20th of July, 1882, the Government being authorized to make a grant of public lands along its entire extent not exceeding twenty miles on each side. According to the proposed act the title will be 'The Canadian Pacific Railway.' The starting point on the Atlantic side will be near Lake Nipissing 'to some point on the shore of the Pacific Ocean.' The work is not to be executed by the Government, but by a private company, who must have at least \$10,000,000 of subscribed capital, of which a tenth must be deposited as caution money; the total of land to be granted is not to exceed 50,000,000 acres, and the money subsidy is to be limited to \$30,000,000—a sum which the Government are empowered to raise by loan. The gauge is to be 4 feet 8½ inches, and the head offices of the company are to be in the city of Ottawa. The estimated length of the whole undertaking is 2,700 miles."

Mississippi Valley & Western.

An officer of this company writes to us as follows under date of June 10:

"This company has just completed the great and important link between Quincy and Keokuk of 40 miles, making a through and direct all rail route from St. Louis to St. Paul, and on the 15th inst. propose putting on a St. Paul Express running each way, north and south, daily, making close connection, the time being only 27 hours between the two cities. It will also run another express from Keokuk to St. Louis, each way daily, making two passenger express trains to Keokuk and cities north to St. Louis, and returning each day; and in addition to the two trains named above it will run an accommodation train (freight and passenger mixed) from Quincy to Keokuk, each way daily. It is presumed that three trains daily each way will be amply sufficient for the present to transport the immense traffic which must necessarily be carried over so important a line. On their western line, the terminus of which is Canton, the grading has been completed to the North Missouri in Schuyler County, a distance of about 70 miles, and the company will commence laying track about the first of July, about 600 tons of rails already having arrived, and 2,000 tons more being in transit. This line, when completed west, will be a most direct through line from eastern cities through Northern Missouri, there being no road of any importance north of the Hannibal & St. Joseph Railroad to the northern boundary of State."

Our correspondent seems to forget that the Quincy, Missouri & Pacific Railroad, which is not only graded but in operation for 40 miles or more, is north of the Hannibal & St. Joseph, and also that the Missouri, Iowa & Nebraska has more than 50 miles of track laid south of the Iowa line, and as both intend to complete their lines to the Missouri, they promise to be of some importance, and, indeed, are not to be left out of the account now in considering the railroads of North Missouri. The route of this western branch of the Mississippi Valley & Western is, we believe, northwestward from Canton, and for a part of the distance to the North Missouri Railroad is very near the line of the Missouri, Iowa & Nebraska.

The completion of the railroad between Keokuk and Quincy completes a line along the river bank from Louisiana, Mo., to New Boston, Ill., owned by three different companies. Beginning at Rock Island, about 45 miles above New Boston, we find another river line which is nearly uninterrupted to the Minnesota line. By the close of the year or earlier there will probably be an uninterrupted line from Clinton, Iowa, to St. Paul, Minn., all but a few miles on the west bank, and owned by companies which are likely to act in harmony. There is likely, too, to be an extension of the river line south of Louisiana toward St. Louis, but it will probably leave the river to the east many miles above the mouth of the Missouri. These roads have the advantage of the numerous thriving towns which have grown up on the river, and the disadvantage of the steamboat competition, which compels the adoption of very low rates a large part of the year.